OpenMPT Manual

Help Document And Function Reference

Introduction

Acknowledgments

This manual, like OpenMPT itself, was created by a group of voluntary contributors to be able to offer a single, well-written, consistent and up-to-date help document for OpenMPT. It is largely based on the original works of Harbinger and his Offline Help Manual [1], which he wrote over the course of many years.

It is very well possible that this manual still contains wrong facts, incomplete or hard to understand sections. Errors do not fix themselves, so you are invited to join our wiki at http://wiki.openmpt.org/where you can edit, fix and extend the manual's source.

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This manual has been generated on September 22, 2012.

References

[1] http://forum.openmpt.org/index.php?topic=4387.0

About OpenMPT

What is Open ModPlug Tracker?

To put it simply, Open ModPlug Tracker (OpenMPT) has always been and will always be an application that makes it easy to compose music. Using mostly a text-based event editing system, plus several expanded features including MIDI input and VST plugins, this free software has enough user-friendliness and flexibility to please all composers from the EDM tracker to the experimentalist to the classical composer.

OpenMPT is first and foremost **tracking** software (self-contained, **not** a plugin), but many features have been added to give it a few **sequencing** capabilities. It can play software plugins that adhere to Steinberg's Virtual Studio Technology, called VST for short. It's also possible to not only set up external MIDI devices for both input and output, but also chain together many sets of output routes that lead to the Master Audio.

Feature Overview

- It's totally **free**!
- The workspace is intuitive and efficient, with a simple Windows-oriented interface, plenty of tooltips on most interactive items, and separate specific sections of work into tabs.
- It allows for a rich set of options and preferences, including:
  - Ability to customize the GUI colour (but no skins yet), including loading and saving color schemes.
  - Full mixing capabilities, including a global equalizer and other effects, up to 127 channels for pattern data (each with their own volume, pan, and plugin settings, as well as customizable channel names), and separate volume controls for sample playback, instrument plugins, and global output.
  - Customizable event detail (ticks per row), audio playback detail (sample and bit rates), polyphony, and latency buffer.
  - Ability to automatically save the current file at intervals — and to a location — of your choosing.
  - Ability to customize most actions with keyboard shortcuts, including navigation, input, and opening dialog boxes.
- It has a side panel with expandable directory view to locate relevant files quickly.
- It can open or import a wide range of tracker formats, including backward compatibility with files saved under previous versions of ModPlug Tracker.
- It can export to .wav or .mp3 audio formats, as well as render individual patterns, channels or instruments.
- It can use General MIDI instruments installed with Windows, or loaded from other sources.
- There is a decent MIDI implementation through channel effects, including input and playback with external MIDI devices.
- It can make full use of VST technology, with support for the VST specifications up to revision 2.4.
- It can process audio through many different sound drivers, including ASIO, which is OpenMPT's default sound driver if available.
- It can apply alternate tunings (including scales and temperaments) to sample playback.
- There is ongoing development and improvements.

Limitations

- Limited control for editing of sample data.
- Inability to directly load program banks for VST plugins.
- Alternate temperaments cannot be applied to VST instruments.
- Can only use a text-based editing system; no piano-roll or musical score editing.
- Only available as a native Windows program, but can also run in Wine on Mac computers and Linux.

History

The ModPlugin was originally developed in the mid-90s by Olivier Lapicque as a plugin for Internet browsers to listen to tracking files (such as .mod and .it files). From this plugin, he developed the ModPlug Player and the ModPlug Tracker. ModPlug Player can play a very wide variety of tracking files, and uses many different audio effects, such as graphic equalization, reverb, and Surround Sound. Although it is still available, the Player is not open-source nor is it being developed.

ModPlug Tracker became completely open-source in 2004, allowing the actual application to be developed and the code altered for the correction of long-standing bugs and the implementation of new features, such as the advanced use of VST plugins and alternate tunings. It has been rated as one of the top five free music trackers by the Computer Music Magazine, and has a vibrant community [1].

References

[1] http://openmpt.org/community

System Setup

System requirements

System requirements are few. All you need to run and use OpenMPT is:

- Pentium 1 or a better CPU
- Working sound card, the newer the better
- Windows 98 SE or newer (KernelEx [1] is required on Windows 98 SE / Me)
- A display resolution of 800x600 or higher.

Expandability

Other options to make OpenMPT a great user-friendly application:

- MIDI-compatible external device, with the correct plug into your computer. See the MIDI Reference for setting up a MIDI device for use in OpenMPT.
- External speakers or headphones, including Surround Sound or Quad-Stereo systems for soundcards that can allow those send configurations.
- Software plugins (either VST or DirectX plugins) that are compatible with your computer and operating system.

Please note that OpenMPT itself is very modest when it comes to system requirements, but many plugins come with their own system requirements and you will need a much more powerful rig to run some of them.

Installation

1. Download [2] OpenMPT. The application and its supplemental files are offered in an installer as well as a .zip file.

2. If you are using the installer software for OpenMPT, you will be asked where you wish to create the OpenMPT folder. If you are updating a previous version, the installer will replace the old files and folders with any new ones by default as well as update the registry (for file associations) if necessary. In case you are using the .zip archive, unzip the archive to the folder of your choice; usually this would be "Program Files" but you are free to choose your own accessible folder.
   Note: As with all software, updates may not be as stable as their previous versions, or features that you have become accustomed to may have been reworked in the new version. Although the Installer will keep the old user files (by giving the files a new extension), it is recommended you backup your previous version of OpenMPT until you are satisfied with the upgrade.

3. When you run OpenMPT for the first time, the Options dialog will appear automatically to allow you to set up how you want OpenMPT to run. There are many ways to customize OpenMPT, but the main thing you want to start out with is setting options for the Soundcard. Click on the Sound Card tab, and consult the Reference section on Soundcard Options for determining how best to set up for your computer system. For most Windows systems, you should be able to use the default settings and jump right in, but you might be able to improve your OpenMPT experience by changing them to what you machine is capable to do.

Portability

If you would like to use OpenMPT on a flash drive or other removable media, there is an option to keep OpenMPT self-contained so that it does not leave a footprint on the computer's system; this is called "portability." Normally, using OpenMPT's installer affects the system registry and creates a new folder in the Settings directory. Portable Mode bypasses all of these. Here is how to achieve complete portability for OpenMPT:

1. If possible, use the OpenMPT Installer software to create a new OpenMPT setup on your removable drive. There is an option for installing a portable version of OpenMPT, which will not touch the registry (unless you choose to set up file associations in the installer) and use the application's directory for saving configuration files.

2. If you need to do this manually, however, you will need an existing installation from a non-portable drive. Copy all of the files in the original OpenMPT folder to a new folder on the portable drive.

3. If you do not need to use previous configurations and settings that were already created, simply create a new text file in the portable OpenMPT folder, open it in a text editor, and enter the following two lines: `[Paths]`
`UseAppDataDirectory=0`

Now save the file as **mptrack.ini**, and close it. Skip to (5).

4. If, on the other hand, you **do** want to import your previous configurations (like keyboard shortcuts, tunings, and other preferences), you will need to navigate to OpenMPT's setting folder by using the "Configuration files" shortcut (if you have used the installer) or the file "open_settings_folder.bat" (if you have used the .zip archive). You may also use the "Show Settings Folder" option from the Help menu. In all cases, you will be redirected to the folder `%APPDATA%\OpenMPT`. From this folder, copy all of these files to the root directory of the portable **mptrack.exe** (i.e., into the same folder). This includes **mptrack.ini**, **Keybindings.mkb**, **plugin.cache**, and the **tunings** folder. Open **mptrack.ini** in a text editor (such as NotePad) and find the line which says [Paths]. Insert the following line after it: `UseAppDataDirectory=0`

This will cause OpenMPT to look in the same folder as itself for the necessary files/folders.

Close the file.

Be sure to adjust the paths in the General and the Auto Save pages of the Options dialog.

5. Now OpenMPT is completely portable! If you will be working away from your main computer, be sure to copy all of your samples, instrument files, and plugins you need onto your portable drive (although they do not have to

be in the same folder as the application). If you wish to edit previously assembled tracks, those need to be copied as well. Consider using a Briefcase folder to make sure duplicate files on two different drives are kept updated.

Alternatively, you can force OpenMPT into using portable mode by specifying the /portable command-line switch.

Important notes: If you load any tracks which use plugins, or links to samples (like those in ITP files), on your non-portable drive when it is not connected to the computer where you composed the track, these will most likely not load properly.

- Plugins need to be installed on the same removable drive as OpenMPT or else they cannot be found on another computer. Before opening a track that requires plugins from other places on that computer, you will need to re-establish the location of its plugins within the Plugin Manager, **then** open the track and everything should work properly. If you open the track first before re-establishing the plugins, **do not save the track** or you will lose all of the plugin settings. Close the track and reset the plugin locations first.
- Tracks that use links to samples and instruments (OpenMPT's ITP format) will load the instrument slots but without access to the samples (if they cannot be found), they will not sound. The best way to solve is to save all required instruments on the removable drive and use the same driver letter on all computers it is used on. Paths in ITP files are current not "portable".

References

[1]   https://sourceforge.net/projects/kernelex/

[2]   http://openmpt.org/download

Basics

Nomenclature

A variety of terms are used in this manual and the application; some basic and often-used terminolgy shall be explained here:

- **ModPlug Tracker / MPT / OpenMPT**: All of these terms refer to one and the same piece of software. :-)
- **Track / Module / Song**: One entire song file.
- **Channel**: One vertical set of event data in a tracking file. This is the equivalent of a sequencer's "track".
- **Column**: One vertical row of information in a channel. OpenMPT has four columns in a channel: **Note** column, **instrument** column, **volume (effect)** column, **effect** column.
- **Cell**: One column in one row (the smallest unit in a pattern).
- **Event**: One action executed in a channel, including the note and its assigned instrument and (if any) effect. In OpenMPT, only one event per channel can be played at a time. Chords for an instrument must be divided into several events spread over several channels.
- **Note column**: This is the first column in a channel and contains note data.
- **Instrument column**: This is the second column in a channel and specifies which instrument should be played when a note is triggered. Numbers entered into this column are *decimal*.
- **Volume column**: This is the third column in a channel. Initially only used for setting volume of a playing sample, it can actually also contain other effects such as pitch bend, so the term may be misleading. Numbers entered into this column are *decimal*.
- **Effect column**: This is the fourth column of a channel. A large variety of effects that change the currently playing note, all notes on the current channel or even the whole playing song can be applied in this column. Numbers entered into this column are *hexadecimal*.

The effect reference provides more insight into the content of the volume and effect columns.

Hexadecimal Notation

Many numbers in OpenMPT are notated using the hexadecimal [1] (often abbreviated "hex") notation. There are various ways to indicate that a number is presented in hexadecimal notation. In this manual, hexadecimal values are notated using the **h** suffix, i.e. the number 128 (decimal) is expressed as 80h. If you are not familiar yet with hexadecimal notation, you should read the short introduction on hexadecimal below, since it is important to be familiar with this notation when using OpenMPT.

In decimal numeration, the system based on tens that everyone of us should be familiar with, a two-digit number shows two things: how many tens (the first digit) and how many ones (the second digit). For example, the decimal number 34 tells you there are three tens and four ones.

In hexadecimal, a two-digit number tells you how many sixteens by the first digit, and how many ones by the second. So the hex number 34h means there are 3 sixteens and 4 ones. Translating a hex number is easy: multiply the first digit by sixteen and add the second digit; the same thing is done intuitively with decimal — multiply the first digit by ten and add the second. So the hex number 34h is 52 in decimal ($16 \times 3 + 4$).

If you know the decimal and you want to translate to hex, simply divide your decimal value by 16 for the first digit and whatever is left over is the second digit. So, 52 divided by 16 is 3, with 4 remaining — 34h.

However, in hex notation there are only enough digits to represent 0 though 9, which are borrowed from decimal; what about numbers $10 - 15$? For those, letters $A - F$ are used, where A = 10, B = 11, and so on. So two-digit numbers counting from 9 to 17 goes like this: 09, 0A, 0B, 0C, 0D, 0E, 0F, 10, and 11.

Translating to decimal with hex letters needs some getting used to, but certain numbers will become automatic with use, such as these:

- 40h = 64: The highest value of many volume and panning related settings.
- 7Fh = 127: The highest possible value for Parametered MIDI Macros.
- 80h = 128: Center value for 8-Bit Panning.
- FFh = 255: The highest possible value for any one-byte value (a two-digit hex number represents a single byte).

Overview of the tracking interface

OpenMPT is a tracking application [2], but over the time, it has gained some sequencer capabilities — the ability to play from external sound generators, including external MIDI synthesizers and "virtual synthesizers" called VST instruments. Furthermore, OpenMPT makes excellent use of the Windows environment, using sliders and buttons for visual-based input, and allowing in many places for different types of parameter setting. The editor interface is mostly still textual in nature, but can be customized for better readability and efficacy. Shown below is the top part of the opening page. OpenMPT's window is resizable and movable, and you can expand it to full-screen viewing. If a file is open, it has its own within OpenMPT's window, and can be minimized, restored, maximized to OpenMPT's window, or closed without quitting OpenMPT. Several files with their own windows can be open simultaneously, but only one can be active, receiving the input focus.
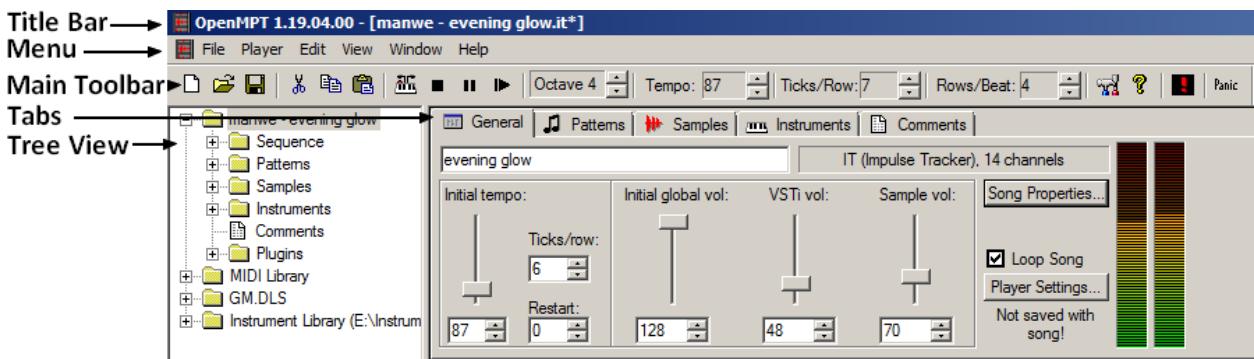
Title Bar

The window title bar shows the OpenMPT version number and the file that is currently active. If there is an asterisk (*) next to the file name, the track has been altered and changes will need to be saved to disk.

Main Menu

OpenMPT's menu is accessible from any part of the program, although some of its features may not be. Like in most Windows applications, the menu is openable by keystrokes; just press the Alt key, then the letter that is underlined to choose the menu or a menu item. A detailed description of all menu entries is available.

Main Toolbar

Below the menu is the Main toolbar, which is visible and accessible from anywhere in the application. You can even pull the toolbar out of its slot and place it anywhere on the screen, by left-clicking on an empty space within the toolbar, holding the mouse down, and dragging it. You can also click-and-drag one of the borders to reshape the toolbar. Since each of the items in the toolbar can be assigned a keystroke, it doesn't have to be visible. You can hide (or show) the Main toolbar by right-clicking on any open spot in OpenMPT's main menu or toolbar, and selecting "Main" from the contextual menu.

Tabs

The interface is divided into five sections, placed within window tabs, which can be accessed from anywhere within the application. These tabs are labeled General, Patterns, Samples, Instruments and Comments.

Tree View

On the left is the Tree View (or Folder Tree), which shows a list of all volumes on your system, and can be opened to show individual folders. This way you can easily locate samples, instruments, and other files to help you in assembling your tracks. To hide this panel, either click on the pane divider between the panel and the tabs, and slide it all the way to the left, or right-click on any open spot of OpenMPT's window, and select "Tree" from the contextual menu that appears.

References

[1] http://en.wikipedia.org/wiki/Hexadecimal
[2] http://en.wikipedia.org/wiki/Tracker_%28music_software%29

Loading and Saving

Overview of module formats

File formats that can be read and written by OpenMPT

The MOD format (.mod)

The MOD format was the first file format for tracked music on the Commodore Amiga. A very basic version of this format (with only very few effects and short samples supported) was introduced by Karsten Obarski's Ultimate SoundTracker. It was designed to use 4 channels each with one voice. Ultimate SoundTracker was soon superseded by ProTracker, which allowed for more tracker commands (effects), longer samples and more improvements. Later, variants of the MOD format that appeared on the Personal Computer made use of 32 channels, exceeding the original Amiga limits. Arguably one of the most widespread tracker formats (because of its use in many computer games and demos), it is also one of the simplest to use, but this is due to its few note-driven effects. With OpenMPT, you can use up to 32 tracks (the default is 4), and note data includes sample numbers (as opposed to instruments, which cannot be used in the MOD format). Initial tempo, number of rows (always 64), and the "time signature" cannot be defined (always uses the highlight values provided in the Colour setup). There is limited sample control and few global settings.

The ScreamTracker 3 format (.s3m)

Scream Tracker 3's S3M format added sample tuning (defining the exact frequency of the middle C for samples), increased the number of playback channels, made use of an extra column specifically for volume control (which was extended by other trackers to handle panning commands as well), and compressed pattern data for smaller file sizes. OpenMPT has similar limitations when working with S3M files as MOD, except with the S3M format, you can set the initial tempo and speed (ticks per row), initial global and sample volume, initial channel pan, and set each sample's playback frequency. Compared to MOD, there is also a different, more expanded set of effect commands.

The FastTracker 2 format (.xm)

With the XM format, Fasttracker 2 introduced the concept of "instruments", which applied volume and panning envelopes to samples. It also added the ability to map several samples to the same instrument for multi-sampled instruments or drum sets. It uses MOD effect command letters, plus a few of its own for more sound control. You can define initial tempos and speeds; provide envelopes to samples by assigning them to instruments; set sample looping and apply automatic sample vibrato oscillation; and with OpenMPT, apply VST plugins to instruments, channels, or the whole track.

The Impulse Tracker format (.it)

Impulse Tracker introduced the IT format, which, in comparison to the XM format, allows instruments to also specify the transposition of assigned samples depending on the note being played, applying resonant filters to samples, and defining "New Note Actions" (NNAs) for instruments to release playing notes on a pattern channel while a new note is already playing, which helped to increase polyphony without having to resort to more pattern channels. Samples also have decent compression in file storage when saving IT files directly in Impulse Tracker. IT effect commands use a more advanced set of S3M commands.

The IT Project format (.itp)

ITP is a version of OpenMPT's IT format, which, instead of storing the samples internally, stores the relative links the sample files, making a file in this format rather small but still full of OpenMPT's IT features. It also makes less of a memory footprint on one's hard drive, because the sample is not duplicated for storage into the track file.

The OpenMPT format (.mptm)

MPTM is OpenMPT's own format. It follows the IT format, except there are added capabilities of tunings, Parameter Control events, and Pattern Sequences and many more features.

The MIDI format (.mid)

MIDI files are of course no module files. They store instrument parameters and patterns in a block format that is not easily converted to a tracker format.

OpenMPT can import many MIDI-sequenced songs in the MID format, but it is important to remember that sequence files are not the same as tracks and the data within the file does not translate well to a tracking format. The main problem that OpenMPT has with MIDI importing is that the events are not lined up in evenly or uniformly in channels, so that, while all the events may be brought in, you have to spend hours clicking-and-dragging all the events to their proper time and channel.

Users at the OpenMPT forum have suggested the following to import MIDI files. Until the MIDI capabilities are quantified and streamlined, this is all we have.

- When importing MIDI files, experiment with the File Import speed in the MIDI Setup. Usually the higher the speed, the more will be brought in to each pattern.
- Quantize the original MIDI file in its original application to 120 BPM and try to import with OpenMPT.
- Use a third-party application to convert a MIDI file to a track, then open the track in OpenMPT. Suggestions are MID2XM [1] (a Win16-based shareware application, so will not run on 64-Bit Windows systems), BeRoTracker [2] (a freeware tracker) and Renoise [3] (a commercial application which handles MIDI files well) together with Xrns2XMOD [4] (as Renoise does not output files readable by OpenMPT by default).

File formats that can only be read by OpenMPT

The following formats can be imported into OpenMPT. Internally, they are converted to one of the file formats described above. Depending on the source format, conversion might not always be accurate.

- Composer 669 / UNIS 669 (.669)
- ASYLUM Music Format / Advanced Music Format (.amf)
- Extreme's Tracker / Velvet Studio (.ams)
- DigiBooster (.dbm)
- X-Tracker (.dmf)
- DSIK (.dsm)
- Farandole Composer (.far)
- General Digital Music (.gdm)
- Imago Orpheus (.imf)
- Jazz Jackrabbit 2 Music (.j2b)
- DigiTrakker (.mdl)
- OctaMED (.med)
- MadTracker 2 (.mt2)
- MultiTracker (.mtm)
- Oktalyzer (.okt)

- Epic Megagames MASI (.psm)
- PolyTracker (.ptm)
- Scream Tracker 2 (.stm)
- UltraTracker (.ult)
- Unreal Music (.umx) *only from Unreal (Tournament 1), Deus Ex and Jazz Jackrabbit 3D*
- Grave Composer (.wow)

Compressed modules

OpenMPT also handles several compression formats, so you do not need to extract modules from these formats to be able to listen to them: Modules in ZIP, RAR, LHA and GZ containers can be opened directly. Modules in ZIP or RAR archives make use of custom file extensions sometimes; Instead of ZIP or RAR, the file extension might be one of the following: MDZ, S3Z, XMZ, ITZ, MPTMZ, MDR.

OpenMPT cannot save modules into compressed files, you will have to save your work as a normal module first and then compress it e.g. with Windows' zip capabilities or other third party compression utilities.

Some module-specific compression routines are also supported, for example XPK and PowerPack PP20.

Furthermore, OpenMPT can handle MO3 files. MO3 is a highly compressed module format with lossy sample compression. MO3 encapsulates the features of several module formats (IT, XM, S3M, MTM, MOD), but with one big difference: MP3 and OGG compressed samples. It also has a lossless codec for any samples that do not like lossy encoding, and the whole file structure is compressed too. [5]

MO3 files can only be read if unmo3.dll is present in OpenMPT's root directory; This file is shipped with OpenMPT, but can also be downloaded separately [6].

References

[1]   http://www.un4seen.com/mid2xm.html
[2]   http://berotracker.de/
[3]   http://www.renoise.com/
[4]   http://xrns2xmod.codeplex.com/documentation
[5]   http://www.un4seen.com/mo3.html
[6]   ftp://ftp.untergrund.net/users/sagamusix/openmpt/archive/unmo3/

Saving and exporting

Saving tracks

Saving your track is done the same way as with most Windows applications; these functions are found under the "File" menu. If, when saving in this way, you wish to save a backup of the file you edited, set the "Create Backup File" checkbox in the General Options.

You can also set up OpenMPT to automatically save copies of your work in intervals. This is done in the Auto Save page in the Options page.

Exporting tracks

Exporting is different from saving in that it does not change the file in its current format, instead saving a copy in the way you desire. You can export to a number of different formats — as a WAV audio file, an MP3 audio file, a MIDI sequence file, or an "unhacked" version of the module format the track is in (so-called compatibility export).

Wave Export

When exporting to WAV, you are first prompted how you want to export the audio from the track, as shown in the dialog box on the right. Here is a brief description of your options in this page.

Audio Quality: You can change both the Sample Rate and the Channel / Bit Depth of the resulting audio file, but keep in mind that the sound quality may be noticeably worse than expected if you composed the track in one setting and export it with a lower-quality setting. Keep in mind that some plugins do not like their sample rate to be changed, so if you choose a different sample rate than the one from the Soundcard settings, some plugins may produce strange output.

Setting up Wave export for a module

Change Player Options: When exporting to audio, **all** of the player settings including the Equalizer will be applied. Click on this button to change the options or to disable these settings.

Channel Mode: If you check the Channel Mode box, each pattern channel is exported separately.

Instrument Mode: Similar to the Channel Mode option, this will export every instrument separately. Note that Channel Mode and Instrument Mode are complementary, i.e. they cannot be used at the same time.

Normalize Output: Checking this box allows OpenMPT to amplify the audio data so that the highest volume equals the highest possible volume. The effect this has is that low-volume audio waves are made louder, while audio that already has loud sections will not be changed. See the section on normalizing audio for more details.
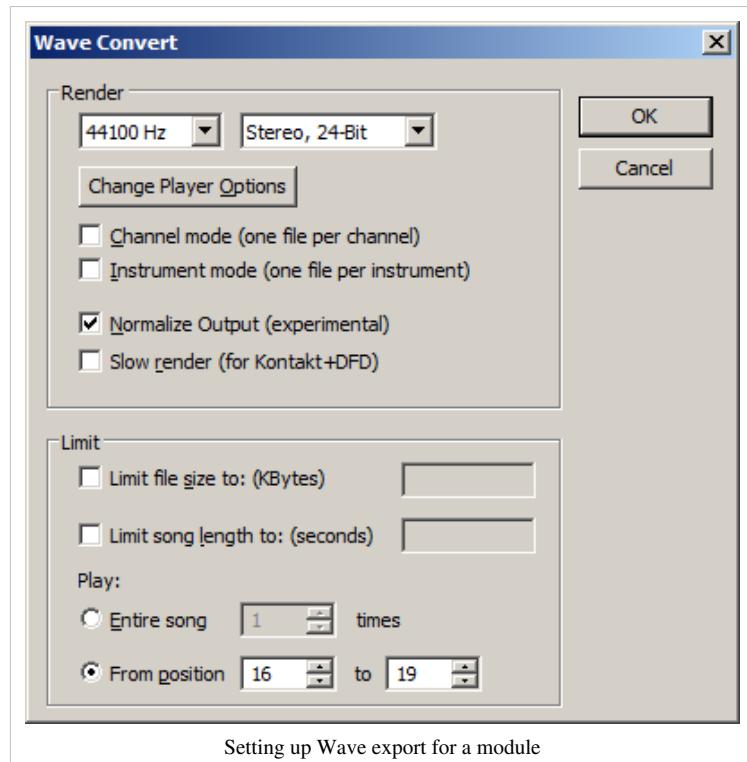
Slow Render: Plugins that use Direct-from-Disk sample streaming such as Kontakt may not cope with OpenMPT's export speed and thus output might not sound as intended. If you are using one of these plugins, enable this option and WAV export will be slowed down automatically. Do not enable this option if it is not needed by the plugins you use, as all it really does is just slowing down the export process.

Limit File Size: Check this box to limit the export based on the maximum file size in kilobytes. This does not change export quality, but simply stops the export when the file size you fill in has been reached.

Limit Song Length: Check this box to limit the export based on the file size in seconds. Fill in the number of seconds in the box. This and the previous option are ideal for creating previews of the track audio.

Play: You have one of two options on how to output the track to its audio file — either the entire song (one or multiple times) or a section of the song. If you want to save part of the song, click the "From Position" radio button, and fill in the start an end pattern positions (inclusive) to output.

MP3 Export

When exporting the track to an MP3 file, you will first be prompted for the location where you wish to save it, *then* you will be given the Export options (the opposite procedure from the WAV export). Here is a brief description of the settings in the MP3 Export dialog.

Encoder: If you have more than one MP3 encoder installed, you will have more than one option listed here. Click on the field to choose a different encoder.

Format: Click on the field or the arrow to open a menu which shows the choices in the bit rate, sample rate, and number of channels you can export to.

Limit File Size: Check this box to limit the export based on the maximum file size in kilobytes. This does not change export quality, but simply stops the export when the file size you fill in has been reached.

Setting up MP3 conversion

Limit Song Length: Check this box to limit the export based on the file size in seconds, which you can enter in the box. This and the previous option are ideal for creating uploadable MP3 previews of the track audio.

Song Information: For MP3 files, you can create information about the track in what is called metadata, or more commonly "tags". OpenMPT can export the most common tags such as Arist Name, Genre and Comments. The Song Title is automatically exported. OpenMPT writes out ID3v2.4 tags, which are currently not recognized by various applications like Windows Explorer - more compliant audio players will have no problems with reading ID3v2.4 tags, though.
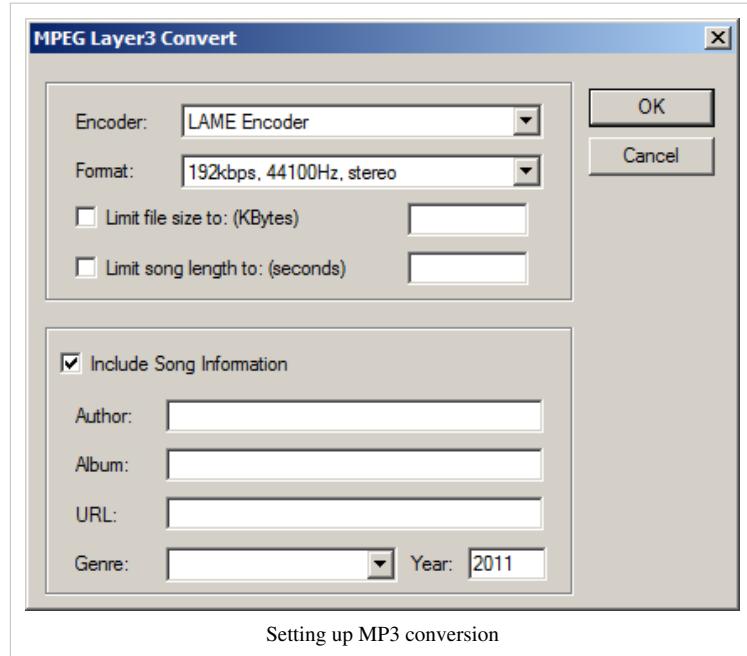
MIDI Export

With MIDI Export, you can save your track as an equivalent MIDI file. Every pattern channel is exported to a separate MIDI track. Keep in mind that this will not consider all of the track commands and almost all playback settings.

You will first be prompted for the export location, then the MIDI Export dialog will be shown. Here you can go through each instrument you have set up and define which MIDI instrument will substitute for it.

Setting up a module for MIDI conversion
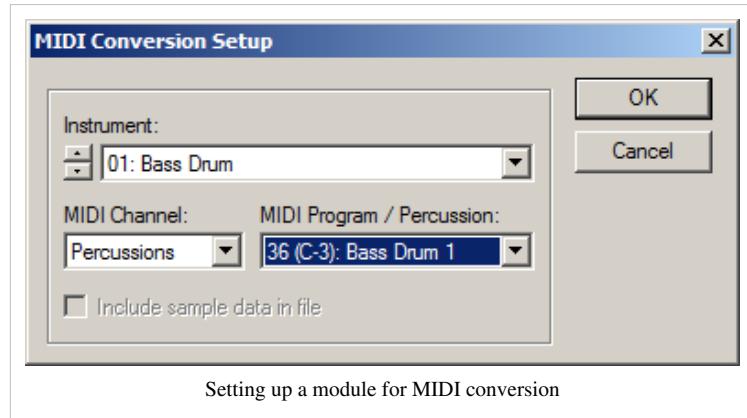
While OpenMPT can export to a .mid file, these sequencer files are not pattern-based, and events will often be exported incorrectly. Several users have come up with various tips on exporting an OpenMPT track to a sequencing format. Here is a good way to export to MID format:

• Use a copy of your original track, as you will need to make some modifications to basic settings.
• In the Song Properties dialog, set the Tempo Mode to Modern.
• In the General page, set the Ticks per Row to 5 and the Tempo to 100; others have had success with 6 and 120, and 3 and 120.
• When exporting, OpenMPT only accounts for two effect commands — Dxx (Pattern Break) and Axx / Fxx less than 20 (Set Speed). All others are ignored and are not considered. So if you have Pattern Jumps, you will need to delete those and reconfigure the Order List to reflect the pattern sequence.
• Export to MIDI, converting each channel as "Melodic" (as shown in the graphic above).
• Instrument: Shows the current instrument to apply the MIDI conversion to. Clicking on the field opens a popup menu listing all of the instruments in the track ("instruments" in this case actually refer to sample slots within the source track; if the sample slot does not contain sample data, it will not be exported).
• MIDI Channel: The channel to transfer the instrument to. In .mid files, each instrument is reserved for one channel (except when using Program Change MIDI commands, but these are not used inOpen MPT's conversion). In General MIDI specifications, channel 10 is reserved for drums. Every place in the source track where the current instrument is called (no matter where it is found), it will be transferred to the channel that is specified here. If there are more than 16 instruments, you will have to decide which will share channels.
• MIDI Program: The MIDI program (instrument) that the track instrument will be transferred to. **Note**: Drum keys below 35 (Acoustic Bass Drum) and above 81 (Open Triangle) are not entirely standardized. Depending on the application or device used to play the exported .mid file, they may turn out as the desired percussion.
• Include Sample Data: (not functional)

Compatibility Export

Past developers of ModPlug Tracker added various features to some module formats in an effort to incorporate desired functionality — the term for these modifications is "extensions" — or more loosely, "hacks". While they allow more flexibility for OpenMPT to edit and play these formats, they cause problems or are ignored in other tracking software, including many popular players.

Exporting to the track's original format specifications is called Compatibility Export, and removes the OpenMPT hacks for that format. However, this may alter the original sound of the track if it was composed in OpenMPT (but this may be desired in order to provide for better portability). Compatibility Export only works with XM and IT files, as MOD and S3M files are never saved with hacked-on extra information. Below is a list of OpenMPT's file format extensions and their differences in Compatibility Export:

ModPlug Extensions for IT tracks

	Default Save	Compatibility Export
Channel Limit	Up to 127 channels	Up to 64 channels
Tempo Range	32 - 512 BPM	Limited to 32 - 255 BPM
Sample Limit	256 Samples (Sample Mode) / 4000 Samples (Instrument Mode)	99 Samples
Instrument Limit	256 Instruments	99 Instruments
Sample Amplification Range	0 - 2000	Limited to 0 - 128

A number of song properties is not saved to compatible IT files as well. Default values that are assumed when re-opening the file are noted in parentheses.

- Extended Filter Range
- Pattern and Channel Names
- Plugin List and Configuration
- VST instrument volume (48)
- Mix Levels (Compatible Mix Levels)
- Extended Playback Flags (More IT Compatible Playback)
- Tempo Mode (Classic Tempo Mode)

Some instrument settings are also omitted. Again, default values are noted in parentheses:

- Ramping (default)
- Resampling (default)
- Plugin settings (no plugin)
- Duplicate Note Check type "Plugin" (no duplicate note check)
- Cutoff variation (0), Resonance variation (0)
- Velocity handling (Use note volume)
- Volume handling (None)
- Force Filter Mode (Channel default)

Also, the following pattern commands are removed completely when saving a compatible IT file:

- Smooth MIDI Macro (\)
- Parameter Extension (#)
- Volume Column Offset (o)

ModPlug Extensions for XM tracks

	Default Save	Compatibility Export
Channel Limit	Up to 127 channels	Up to 32 channels
Order list	No changes	Separator (+++) patterns are removed
Tempo Range	32 - 512 BPM	Limited to 32 - 255 BPM
Sample Assignment	Up to 32 samples per instrument	Up to 16 samples per instrument
Stereo Samples	Saved as stereo	Converted to mono

A number of song properties is not saved to compatible XM files as well. Default values that are assumed when re-opening the file are noted in parentheses.

- Extended Filter Range
- Song Comments
- MIDI Configuration (Default MIDI configuration)
- Pattern and Channel Names
- Plugin List and Configuration
- Default global volume (128), VST instrument volume (48), Sample volume (48)
- Mix Levels (Compatible Mix Levels)
- Extended Playback Flags (More FT2 Compatible Playback)
- Tempo Mode (Classic Tempo Mode)
- Rows per Beat / Measure (default Rows per Beat / Measure)

Some instrument settings are also omitted. Again, default values are noted in parentheses:

- Ramping (default)
- Resampling (default)
- Plugin settings (no plugin)

Also, the following pattern commands are removed completely when saving a compatible XM file:

- Command X extensions (X5x, X6x, X7x, X9x, XAx)
- Panbrello (Y)
- MIDI Macro (Z)
- Smooth MIDI Macro (\)
- Parameter Extension (#)
- In the volume column, slide commands with a 00 parameter (use last value) are removed, i.e. they have no slide memory.

Sharing files and Track portability

When composing in OpenMPT, you may wish to share the track file itself (rather than the audio version of the file) so that other people can see the work involved. This can be a problem if the other party is either using their own copy of ModPlug Tracker or using an entirely different program. If they are using OpenMPT on their own computer, they may have different playback or audio settings or even a different version of OpenMPT, which can be some major issues.

If they are using a different tracking application altogether, ideally they should be able to read and play any unhacked track format (if that application is designed to do so). This is the main reason why a Compatibility Export is necessary when sharing track files. There have been compatibility issues between different tracking applications and as long as you know what these issues are, you can work around it when you are composing with OpenMPT.

Setup Window

Overview

When you open ModPlug Tracker for the first time, the Options dialog is immediately visible, but you can dismiss this if you want to just dive right in. You can also open this dialog box any time by clicking on the Setup icon in the Main toolbar or opening the View menu in the Main menubar and selecting "Setup". You can also set a keyboard shortcut in the Keyboard page of this dialog window, by default it is set to Ctrl+F1.

Setup icon

Structure of the Setup dialog

There are nine pages of behaviour and display preferences that can be accessed by clicking on the tabs the top of the setup dialog. To save the preferences, click on OK (which will also close the window). The following setup pages are available. Click on any of the list items to read more about the corresponding section.

- General - Path setup and miscellaneous options.
- Soundcard - For setting up the device that shall be used to output sound.
- Player - For setting up player effects and resampling options.
- Equalizer - Configuration of the global equalizer.
- Keyboard - For keyboard behaviour and shortcut configuration.
- Colours - For configuring the looks of the editor.
- MIDI - For setting up MIDI recording / importing.
- Auto Save - For setting up the creation of periodic backups.
- Update - For configuring the automatic update check.

Setup dialog
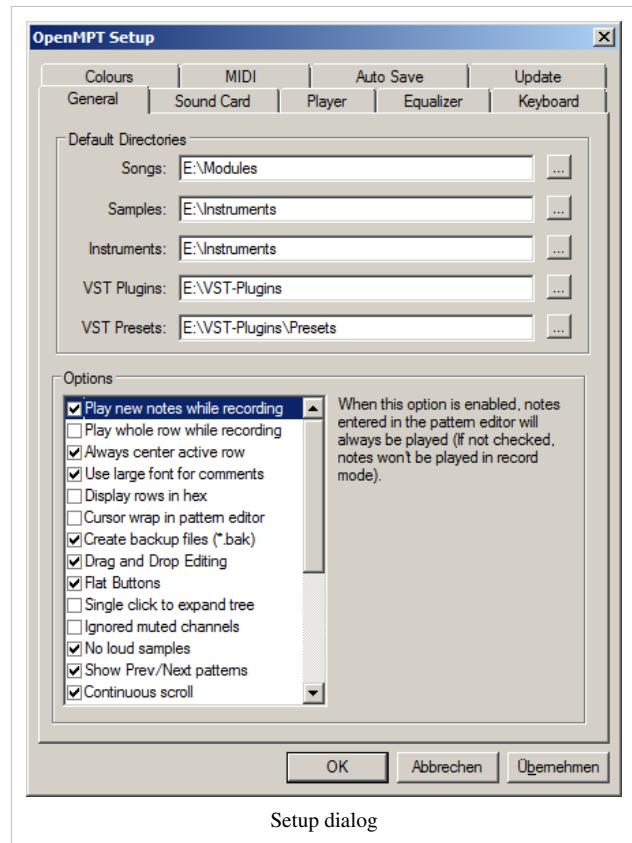
Technical information

Most of the preferences that are set in the Options page are stored in the file mptrack.ini and can be edited in a simple text editor. Generally, however, you want to make these changes within OpenMPT so you can tell what you are doing. Besides the `mptrack.ini` file, there is the `Keybindings.mkb` file (which saves the keyboard shortcuts), and optionally there are `.tun` and `.tc` files (which store individual and collections of tunings respectively), and the `plugin.cache` file (which caches information about previously loaded plugins to speed up the loading process of the program). These files are kept in the folder `"%APPDATA%\OpenMPT"`. However, when using ModPlug in portable mode (such as on a removable device), all of these external files are kept in the root

directory of the ModPlug Tracker application. In either case, you can use **Show Settings Folder** from the **Help** menu to open the folder containing all configuration files.

General

The first tab of the Options page holds miscellaneous settings — namely the paths to various relevant folders, and options that make using OpenMPT easier depending on what you are accustomed to.

Default Directories

ModPlug Tracker, when opening Open File or Save File dialogs, will default to the folders you enter into each of these fields (except for saving previously created files, which will default to their own directory). The folders are for tracks / modules / songs, samples, instruments, VST plugins and another for VST presets. You can type the path manually, or you can click on the Browse button next to it to find the correct folder. Both local and network paths are supported.

Miscellaneous options

To enable any of these options, make sure the box is checked next to the text. To get info on what each toggle does, select the text itself, and

General tab of the settings dialog

Help tips will appear on the right side of the page. Most of the settings you can leave at their default setting if you are new to tracking, but you can get details on their dedicated sections.
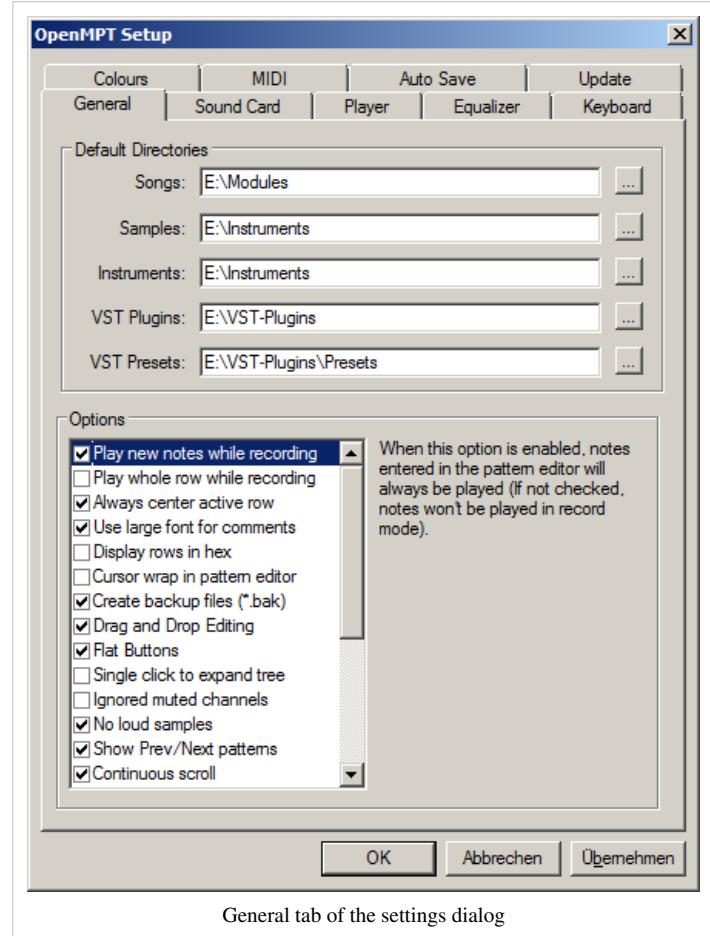
Play new notes while recording

When this option is enabled, notes entered in the pattern editor will always be played (if not checked notes will not be played in record mode).

Play whole row while recording

When this option is enabled, all notes on the current row are played when entering notes in the pattern editor. This option can be used to *preview* how the entire row will sound.

Always center active row

Turn this option on to have the active row always centered in the pattern editor.

Use large fonts for comments

When this option enabled, the song message editor on the Comments tab will use a larger font.

Display rows in hex

With this option enabled, row numbers and sequence numbers will be displayed in hexadecimal.

Cursor wrap in pattern editor

When this option is active, going past the end of a pattern row or channel will move the cursor to the beginning. When the "Continuous scroll"-option is enabled, row wrap is disabled.

Create backup files (*.bak)

When this option is active, saving a file will create a backup copy of the original in the same directory.

Drag and Drop Editing

If enabled, selections can be moved and copied (if shift is pressed while dragging) in the pattern by dragging them.

Flat Buttons

Toolbar buttons are displayed in a flat graphic style.

Single click to expand tree

Single-clicking a node in the tree view will expand it.

Ignored muted channels

Notes will not be processed on muted channels. After unmuting a channel, muted notes are not resumed.

No loud sample preview

Disable loud playback of samples in the Sample and Instrument Editor. The sample volume then depends on the sample volume slider on the general tab when. If this options is disabled, a sample volume of 256 is used.

Show Previous / Next patterns

Displays grayed-out versions of the previous and next patterns in the pattern editor. This setting is only considered if "Always Center Active Row" is disabled.

Continuous scroll

When moving past the end of a pattern, the cursor jumps to the first row next pattern.

Record note off

Record note off events when a key is released on the PC keyboard. Notes recorded via MIDI are not affected by this setting.

Follow song off by default

Ensures that "Follow Song" is off when opening or starting a new song.

MIDI Record

Enable MIDI In Record by default.

Old style pattern context menu

Check this option to hide unavailable items in the pattern editor context menu. Uncheck to grey-out unavailable items instead.

Maintain sample sync on mute

Samples continue to be processed when channels are muted, so they can be resumed at the correct position when unmuting a channel.

Automatic delay commands

Automatically insert appropriate note delay commands when recording notes during live playback.

Note fade on key up

Enable to fade / stop notes when releasing a note key in the pattern tab.

Overflow paste mode

Wrap pasted pattern data into next pattern. This is useful for creating echo channels. This option can also be toggled from the Pattern Editor or through a keyboard shortcut.

Reset channels on loop

If enabled, channels will be reset to their initial state when song looping is enabled. Note: This does not affect manual song loops (i.e. triggered by pattern commands) and is recommended to be enabled to stay compatible with other trackers.

Update sample status in tree

If enabled, active samples and instruments will be indicated by a different icon in the treeview.

Disable modern close dialog

When closing the main window, a confirmation window is shown for every unsaved document instead of one single window with a list of unsaved documents.

Double-click to select channel

Instead of showing the note properties, double-clicking a pattern cell selects the whole channel.

Show default volume commands

If there is no volume command next to a note + instrument combination, the sample's default volume is shown.

Soundcard

OpenMPT automatically detects installed sound devices on your computer, and in this page you can assign settings based on your computer's capabilities. If you are having trouble with playback, you may want to alter these settings so that OpenMPT uses less processing power for rendering audio. For more tips on fixing audio issues, check the troubleshooting section further below.

Soundcard Options

Sound Device

Shows the current audio device and driver that OpenMPT is using. Clicking on this field will open a popup menu where you can choose another driver. The new driver is used as soon as you apply all changes in the dialog.

If you have an ASIO driver installed, OpenMPT will choose this by default. This may lead to some unwanted consequences described in the FAQ if your ASIO driver is not able to play several audio streams at once (like the popular ASIO4All driver).

Soundcard tab of the settings dialog

Buffer Length

The Buffer Length field is the amount of latency you want to employ while using OpenMPT. Basically the Latency setting describes the timing difference between the input or visual display and the audio output. Clicking on this field will open a popup menu where you can choose a different amount. For slower systems you should set the Buffer Length higher. If you have a good system and you are using few or no plugins, you can set this to a very low setting (plugins, however, increase processing load, so you would probably want to set it in the midrange buffer length if you are using any). If you have chosen an ASIO driver, you can often decrease the Buffer Length to less than 10ms and audio playback will still not break.

Mixing Quality

Shows the sample rate in the first field, and the bit rate in the second field. Clicking on either of these opens a popup menu where you can choose another setting amount. Both can also be set custom, and normally you would leave this at the default setting, **unless** you have a very slow system that will not be able to handle heavy amounts of audio processing (in which case you want to decrease the Sample Rate), **or** if you are doing high-end "professional" tracking and your system can handle the processing load (in which case you want to increase the Sample Rate).

It is not recommended to set the bit depth to anything less than 16-Bit. In fact, you should use 32-Bit bit depth if possible for best audio quality and the greatest dynamic range. Since OpenMPT's mixing always code works with

32-Bit precision, using a lower bit depth does not gain performance — on the contrary, reducing the bit depth might indeed require slightly more processing power than just using the already existing internal 32-Bit buffer.

Maximum Polyphony

The maximum number of sound channels that OpenMPT will use to render. In other words, Polyphony is the allowable number of notes that OpenMPT will process at once. Any computer that has been built in the last ten years should be able to handle the maximum amount of channels for most modules, but while older, low-end computers you will want to decrease the number of channels. Note that reducing the maximum polyphony only reduces the CPU load if those extra channels were actually used — if you play a 10-channel MOD file, it does matter little, if at all, whether the maximum polyphony is set to 16 or 256.

MMX / 3DNow! / SSE Acceleration

Checking this box will make OpenMPT use specially optimized render code making use of the MMX, 3DNow! or SSE CPU instruction sets, if they are available on your computer. This feature is mostly useful on older computers, as this acceleration is marginal on faster CPUs. Optimized code is mostly used for sending or receiving audio data from plugins.

Reverse Stereo

Checking this box switches the left and right stereo channels of OpenMPT's audio output.

Soft Panning

Originally thought of as a special panning mode that sounds more pleasant on headphones, this panning mode is forced when using RC3 Mix Levels and always disabled when using Compatible Mix Levels. As this can drastically alter the sound of stereo modules, it should not be enabled.

Pre-Amp

An obsolete feature which boosts the sample volume. It should only be used for adjusting some modules created with a different Pre-Amp level. When using RC3 or Compatible Mix Levels, the Pre-Amp Level is overridden and a default value is used.

Stereo Separation

Allows for greater separation of the stereo channels; moving the slider modifies the amount of stereo separation. On headphones, it may be desirable to set this value to something below 100%, while on a normal speaker setup, stereo separation should be kept at 100%. If your speakers are too close to each other, it might help to increase stereo separation.

Troubleshoot

If you find that your track "stutters" during playback, you may be trying to process more audio than your computer can handle. To troubleshoot, try doing the following in this order.

- First off, try disabling player effects if any of them are enabled.
- Increase Buffer Length in 5-10ms steps.
- Reduce the polyphony setting as much as you can. For a solo piano piece, you can probably reduce this to 8 with no tonal loss.
- Reduce the Mixing Quality one step at a time to a minimum of 22050 Hz. Anything less than this can create a vast difference between what you hear and what will be recorded when you export the file to audio.

If you still encounter stuttering in playback and you are using plugins, you should try to reduce the number of plugins used in your song. If you use an instrument plugin that plays only a few notes or less, consider rendering the notes and importing these notes as samples (more info on rendering is found in the Saving and Exporting section). Sample playback required **much** less processing power than instrument plugin processing. Also, many plugins have very high CPU usage and can soak up a large percentage of your processing power.

Player

This page has settings that depend on how you want OpenMPT to process audio. Keep in mind these settings are **not** saved with modules, but **are** applied to **all** tracks during playback and when exporting tracks to WAV or MP3 format.

In the upper part of the page, the Controls section, you can apply various playback functions to the master audio output. Most are self-explanatory, but **it is not recommended to enable any of these options**. In order for any of them to be applied, you must enable the appropriate checkboxes.

Sound control

Automatic Gain Control

The Automatic Gain Control (also abbreviated as AGC) applies a compressor / limiter-type effect that monitors and keeps the volume within a more-or-less steady amplification. Softer sections will be made louder and loud sections will be softened in volume.

Player tab of the settings dialog
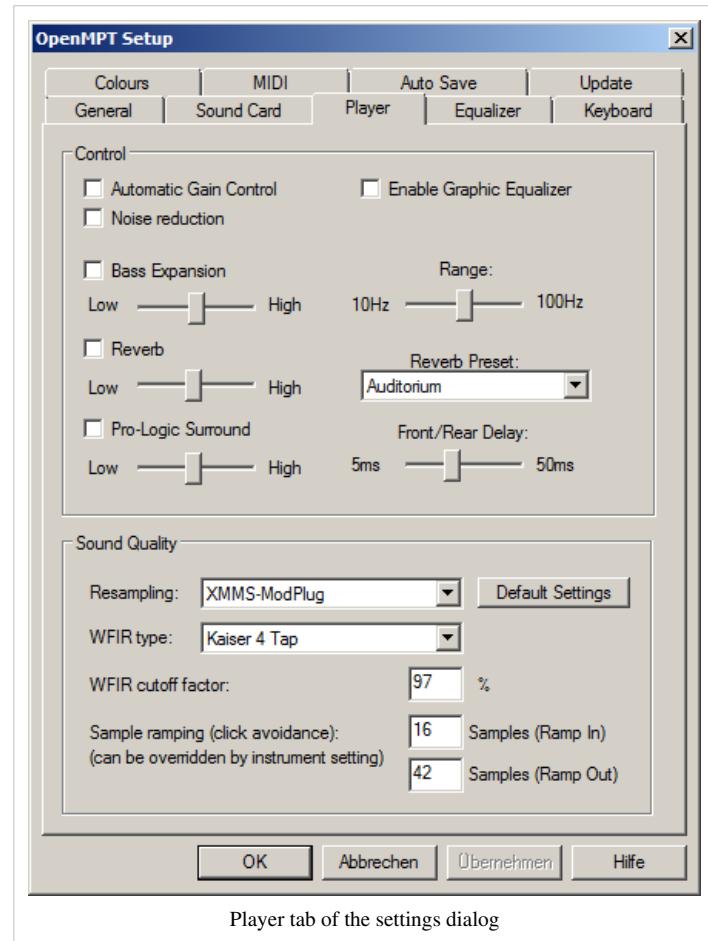
Enable Graphic Equalizer

Applies the Equalizer settings found in a separate tab.

Noise Reduction

A simple (not very high quality) -6dB/octave lowpass filter for filtering out high frequencies, intended to remove noise and hiss. It is not recommended to enable this option, as it may reduce the volume or fidelity of high-frequency sounds, like cymbals and harmonic-rich timbres.

Bass Expansion

Applies a volume boost to the bass frequencies. Move the first slider to adjust bass gain, and the second slider to increase the frequency range to affect. Best used without the equalizer, or not at all (time to get some proper speakers

;-).

ProLogic Surround

Applies Surround Sound to the sound output. When listening to music in stereo, this will mostly be noticable as a slightly delayed echo signal with "wider" stereo sound, but in quad surround mode, the delayed signal is actually played on the rear speakers. Move the first slider to set the amount of the Surround effect and the second slider to configure the delay of the echo signal.

Reverb

Applies a Reverb to sample output (not plugin output). Move the slider to increase the reverb's volume, and choose a Reverb type from the popup menu next to it. Note that reverb can be explicitely turned on and off per pattern channel using effect commands. However, since the reverb parameters are not stored with the module and cannot be changed using pattern commands, it is not recommended to rely on this setting. It is wiser to use a dedicated reverb plugin if you want reverb.

Sound Quality

The lower part of the page, the Sound Quality section, allows you to set how ModPlug interpolates all samples it plays. If you are using high quality samples, this section can be ignored. However, if you wish to do some downsampling to reduce the file size of the track, you may need to keep reading. For the beginner it probably only helps to know what experimentation has taught us concerning resampling.

Resampling Algorithm

The default sample interpolation algorithm can be used here. Interpolation is done when samples are played at a different sample rate than the output sample rate. You can also set the Resampling algorithm separately for each Instrument.

WFIR Type

The specific algorithm when using the XMMS/ModPlug interpolation algorithm. You can choose from a variety of different ones, that for most users all have the same audial effect. But for advanced users who are exacting, this variety should suffice; experiment with each, but remember this algorithm will be applied to all samples that are played.

WFIR Cutoff Amount

The amount of filter cutoff for applying the resampling algorithm. Low values will make the audio sound dull, while a 100% cutoff ratio will create unwanted filter artifacts.

Ramp Amount

Ramping is applied to samples to avoid clicks at the beginning and the end of the sample in order to avoid unwanted clicks from bad DC offsets. The default ramp settings can be configured here, but they can also be overriden by an instrument-specific setting.

- **Ramp In** applies "fade-in" to the samples in an effort to dampen the clicks that come with poorly assembled sample waveforms, or from offset commands that "break into" a loud spot in the sample.
- **Ramp Out** fades out the end of a sample that is stopped through note cuts. However, samples that end on their own are not affected by the ramping value, as a different fade-out slope is used there to prevent clicks from samples that do not end on zero level.

Ramping also makes volume slides smoother, so changing volume levels rapidly does not cause clicks.

Resampling comparisons

While Linear interpolation is the most primitive in mathematics (apart from "No Interpolation", obviously), it is also the harshest in sound quality. Cubic sounds slightly better and with Polyphase, there is a definite improvement with only little more processing power.

The XMMS-ModPlug resampling algorithms provide a similar sound to Polyphase, but handle aliasing (especially in the high frequencies) much better, so this is a good group of algorithms to choose. Kaiser 4 Tap with a 97% WFIR cutoff provides acceptable sound.

Of course, determining the best interpolation method is highly subjective. With old module files, you may prefer to use No (especially for Amiga tracks) or Linear Interpolation (for XM files), while for more recent material you might want to choose a higher quality interpolation algorithm, so it is best to do your own experimentation with the different algorithms.

Equalizer

Playback audio is processed through the Equalizer only if the "Enable Graphic Equalizer" checkbox is set (found in the Player Options page). The Equalizer settings are not saved with the song; they are a global setting applied to any output from OpenMPT.

Equalizer Options

Equalizer Band Sliders

Moving a slider higher to accentuate or bring out those frequencies, or lower to diminish the volume of those frequencies. Right-clicking on a slider will show a contextual menu so you can change the frequency "notch". The Equalizer Bands are by default set at 0, which means no attenuation is applied to that band of frequencies.

Presets

Clicking one of the buttons below the sliders chooses a presets equalizer setting. You can also save your own preset (up to four) by adjusting the equalizer to the desired settings, then clicking "Save Preset."

Equalizer tab of the settings dialog
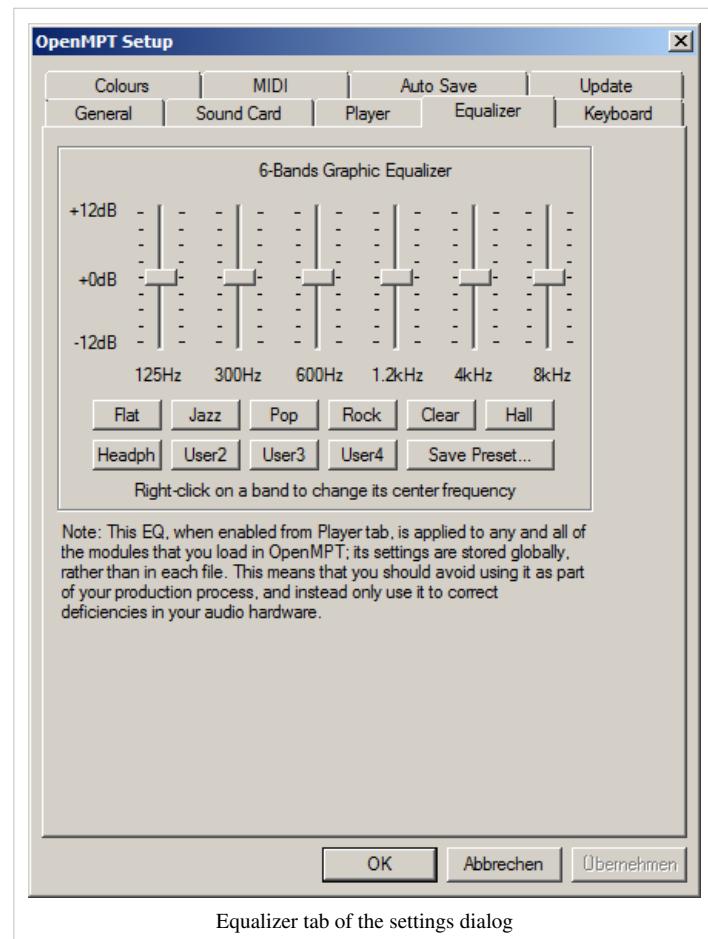
Keyboard

In this page you can choose or edit keyboard shortcuts for many of the actions in OpenMPT, which are always active unless the input focus is within a textbox. OpenMPT keeps an internal default layout, but you can save your own or load others, for example from the extraKeymaps folder in OpenMPT's application folder by clicking on the "Import Keys" button near the middle of the page. The list of the **current** shortcuts are kept in the Keybindings.mkb file in the "%APPDATA%\OpenMPT" folder (or OpenMPT's application folder if in portable mode), but with this dialog, you can save these shortcuts in a separate file for safekeeping or sharing. The following is a description of the various items on the page.

To view or edit keyboard shortcuts, first find the context to which the keypress would be applied by clicking on the Category field. A popup menu will open and you can choose the context to view. If you wanted, for example, to assign the Q key to the base octave C when inputting a note in a pattern, this keypress would be needed

Keyboard tab of the settings dialog

in the Pattern Editor for the note column. So you would select "Pattern Editor − Notes" from the popup menu. The list of assignable note messages will be displayed in the field below it. Select the "Base octave C" entry and select it. Alternatively, if you know the shortcut name, you can type it into the "Find" box.

Limited support for MIDI message handling is also there: Additionally to computer keyboard keys, MIDI CCs may be used to trigger shortcuts while the pattern, sample or instrument editor is focussed. To make use of them, first enable MIDI Input. Then, go to this settings dialog, focus the Key input field and send the wanted MIDI CC using your MIDI device.

If there is a conflict between a new keyboard shortcut and one already assigned, you will be notified in the log window. If the conflicting key assignments cannot co-exist, the old one is deleted.
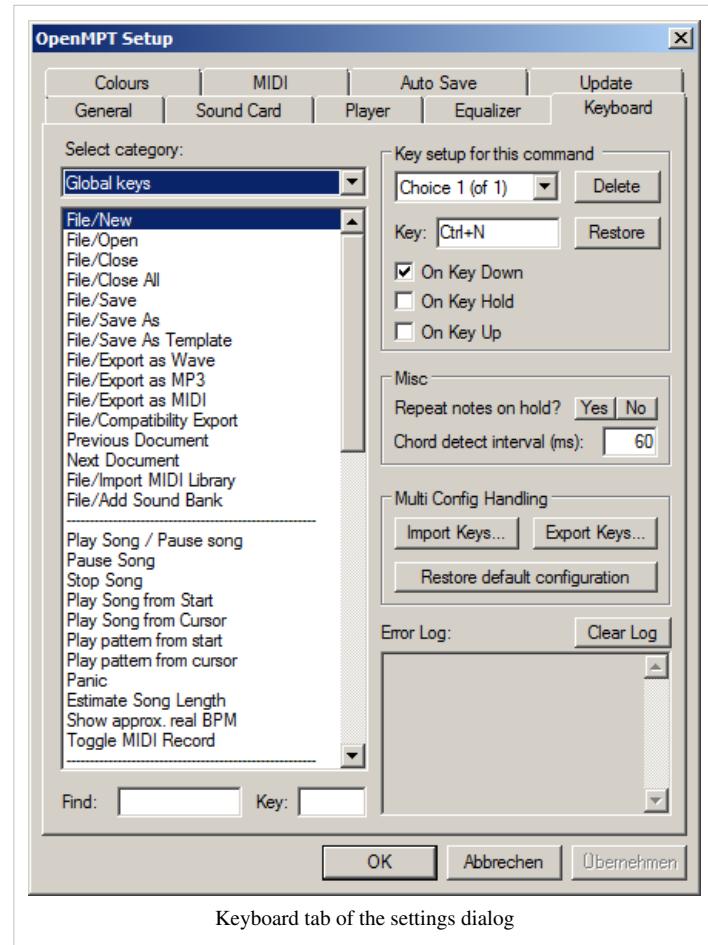
Shortcut List

Select Category

Shows the current set of functions you can assign shortcuts to. Clicking this field opens a popup menu so you can choose which set of shortcuts you wish to edit or assign.

Action List

Clicking on one of the entries selects it for key assignment. See the Keyboard Actions table for a description of the assignable actions.

Find

This can be used to search for a specific shortcut in the complete shortcut list by its name. Instead of searching by name, you can also search by shortcut. Just click on the **Key** edit box and enter the key combination that you want to find (e.g. pressing Ctrl+C would bring up the "Copy" shortcut when using the default configuration). Focus the edit box again to remove the sarch term.

Key Setup

Key setup choice

Only enabled when there is an action highlighted, this field shows the choices of key assignments for this action. If there is no key assigned, it will display `<new>`; otherwise, the text will read `"Choice x (of y)"` where *x* is the number of the current shortcut and *y* is the total count of this action's current key assignments. Clicking in this field will display other choices, where you can select the one to edit.

Key

Shows the key assignment for this shortcut. Clicking in this field (after choosing an action in the Action List) will "listen" for a new key assignment. Any keypresses or MIDI CCs will be entered into this field and assigned to the action as a keyboard shortcut, but in order to deactivate "listening" you must use the mouse and click outside of the field.

On Key Down/Hold/Up

When any of these are checked, the action will be activated at the corresponding event of the keypress, either when the key is pressed down, when it is held down, and / or when the key is released.

Restore

Clicking on this button resets the key assignments of this action to when the action was first selected. If there were conflicts generated, however (see Log below), the altered action is not restored.

Delete

Clicking on this button deletes the current key assignment. If there were other keyboard shortcuts for this action, they remain.

Repeat notes on hold

These two buttons are a shortcut for enabling or disabling the "On Key Hold" property for all **note** keys.

Chord Detect Interval

If you have the Pattern Editor's Row Spacing setting set to some other value than 0 and have a record group set up, OpenMPT will put all notes detected within the Chord Detect Internval on the same row, regardless of the Row Spacing setting, i.e. the notes are interpreted as a chord.

Import Keys

Use this button to import an `.mkb` (OpenMPT keyboard layout) file. This allows you to use an alternate set of pre-defined keyboard assignments.

Export Keys

Use this button to export the current set of keyboard shortcuts to a keyboard layout file. This is helpful not only for multiple users of one OpenMPT setup, but also for testing different setups for ease of use.

Restore Default Configuration

Clicking on this button restores all keybindings to their default keys.

Error Log

Shows conflicts between key assignments. Conflicts occur when one keypress or combination keypress is already assigned to an action within the same context. A conflict may also occur with the keyboard shortcuts of Windows. Sometimes a conflict can be tolerated, such as using the number keys to enter digits in any context. In most cases the **other** action has its shortcut deleted as you assign the keypresses to this action. Other times there is simply a warning that keys may interfere and actually execute two actions. A problem may also occur when modifier keys (Shift, Ctrl, Alt, Windows or the Application key) are expected but another key is assigned. In this case, OpenMPT will not allow the non-modifier key to be assigned.

Clear Log

Clicking this button deletes all the text in the log window.

Colours

While OpenMPT does not use skins or themes in its display scheme, you can set the colourisation of some of the more important GUI elements from within the Colours page.

Display Options

Use Small Font

Checking this box uses a smaller font size so that more rows and channels can be displayed in the Pattern Editor. Disable this option if you have trouble reading patterns.

Enable Effect Highlighting

Checking this box enables colour for the text in the Pattern Editor. If this is not checked, all pattern field contents are drawn in the same foreground colour.

Primary Highlight

The Primary Highlight is the same colour as the "Highlighted" box for the Pattern Editor component, and is equivalent to the Rows per Measure of the time signature.

Colours tab of the settings dialog

Secondary Highlight

The Secondary Highlight is a lighter version of the Primary Highlight, and equates to the Rows per Beat highlight of the time signature.

Colour Schemes

As you select a different component to set colours for, various colour boxes will appear below the Preview box at the bottom. Click on any of these to call up a standard Windows colour selection dialog, where you can choose your colour. As you change a colour, the Preview box allows you to see what it will look like in its context (except for the VU Meters and channel separators).
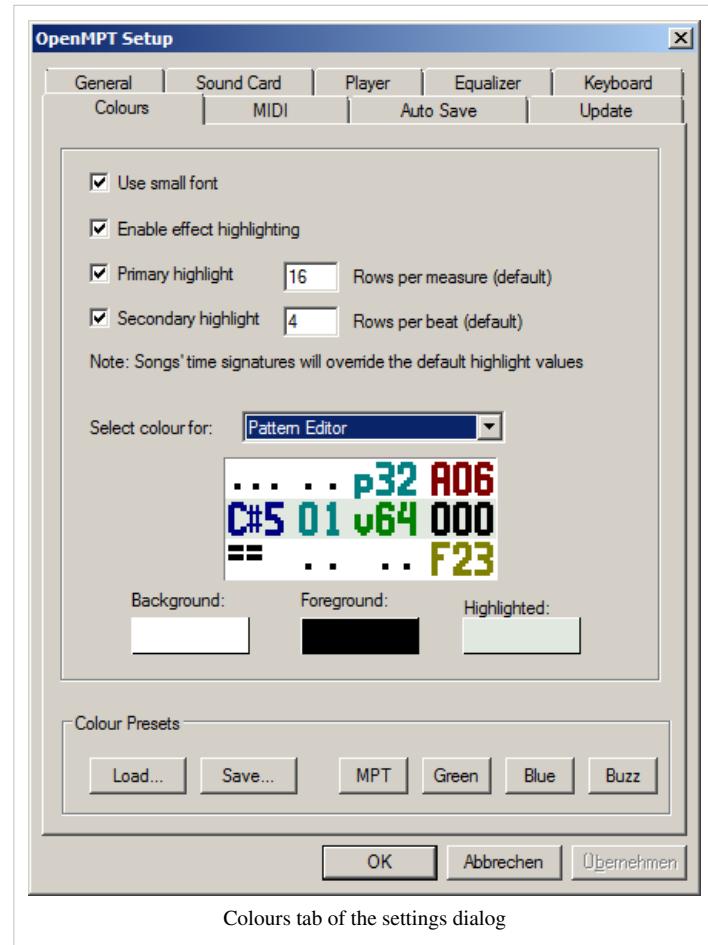
Pattern Editor

The basic colours for rows in the Pattern Editor. The foreground colour is for all fields without data.

Active Row

The highlighting for the Active Row where the cursor is located. The foreground colour is for fields without data.

Pattern Selection

The highlight for any selected area, including the cursor. All selected fields will be coloured the foreground colour.

Play Cursor

The colour for the row where the playback pointer is currently located. The foreground colour will be applied to fields without data.

Note Highlight

The colours for the text or symbols within the Note and Instrument fields as well as volume commands.

Effect Highlight

The colour for the text or symbols within the effect columns. To make each command type stand out, you can differentiate between Panning, Pitch, and Global commands.

Invalid Commands

The colour for any field which contains data that is non-compatible for the track type. Currently, this is only used for notes that are outside the Amiga frequency range when enabling the PT1.x playback mode and S3M files that are set to adhere the Amiga frequency limits.

Channel Separator

The colours for the lines that separate the channels in the Pattern Editor. You can define the colours for each of the three lines that make up the Channel Separator.

Next/Prev Pattern

The transparency tint to apply to the patterns that are displayed before and after the current pattern, which is only visible if the "Always center active row" **and** the "Show prev/next pattern" options are checked in the General Options page.

Sample Editor

The colour to apply to the waveform data in the Sample Display.

Instrument Editor

The colour to apply to the envelope lines in the Envelope Window.

VU Meters

The colours to use on the VU meters on the General page and in the Channel headers of the Pattern Editor.

Presets

In this section, you can load one of the four colour presets ("MPT" is the default) by using the four buttons on the right. Use the other two buttons two load and save your own colour schemes.

MIDI

OpenMPT's MIDI recording is limited, but there are some settings that are worth looking into.

MIDI Recording

MIDI Input Device

Shows the device from which MIDI data will be received. Clicking on the field opens a popup menu where you can choose from all available MIDI input devices. If the list is empty, Windows is not recognizing any MIDI device — check if you have installed your MIDI interface drivers properly.

For help with setting up MIDI devices for input and output, be sure to also consult the MIDI Reference.

Apply Octave Transpose

Checking this box applies the pattern editor's base octave setting to incoming MIDI notes. Effectively, this means that if the base octave differs from Octave 4, this difference is also applied to MIDI notes that are being received.
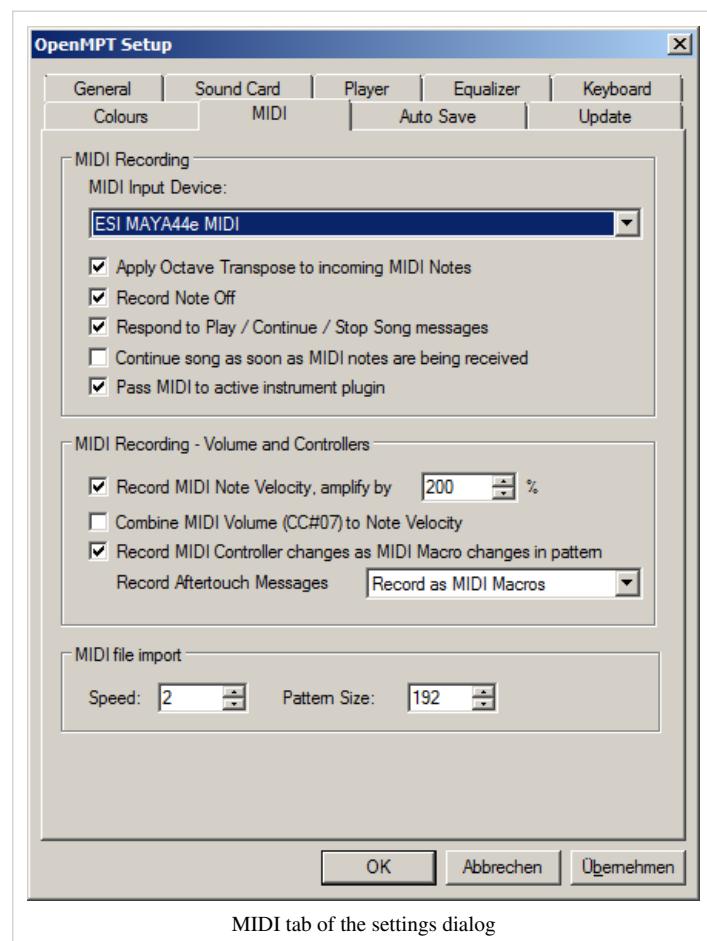
MIDI tab of the settings dialog

Record Note Off

Checking this box records Note Off commands (== in instrument mode, ^^ in sample mode) when recording from the MIDI device.

Respond to Song Messages

Checking this box allows OpenMPT to receive MIDI messages that cause the currently active song to play, stop, or continue.

Continue Song

Checking this box allows for playback to resume (after being paused) when any note key on the MIDI device is pressed.

Pass MIDI to Active Plugin

Checking this box sends MIDI data that OpenMPT receives from an external device to the active instrument plugin.

MIDI Recording - Volume and Controllers

Record Note Velocity

Checking this box records the note′s key velocity into the pattern as a volume effect. Some MIDI controllers may not support note velocity and will always send the same velocity value. You may also change the velocity amplification factor depending on your play style. If you have a hard playing style and use an amplification greater than 100%, this setting may decrease the dynamic range of the recorded note velocity, unless your MIDI hardware compensates for your play style, for example by applying a velocity curve.

Combine MIDI volume to Note Velocity

Checking this box takes transmitted MIDI volume changes (MIDI CC 7) into account and multiplies them with the note velocity when notes are entered from a MIDI device, given that "Record Note Velocity" is enabled.

Record Controllers to Macros

Checking this box makes OpenMPT record incoming MIDI CCs as MIDI macro commands. Note that only macro values are entered; you will need to set up macro assignments in order for the proper controllers to be manipulated. For an easier and more versatile method of recording MIDI events, have a look at the MIDI Mapping.

Record Aftertouch

If you are using a MIDI device that supports aftertouch (both channel pressure and polyphonic aftertouch are supported), you can enable this option to record pressure changes to the pattern as either volume commands or MIDI Macro commands.

MIDI File Import

MIDI Import Speed

When importing MIDI files, this is the equivalent of the track's note detail (found in the "quantization" amount). MIDI tracks often define their song detail by the smallest note length required, such as eighth or thirtysecond notes. Usually, an import speed of two ticks per row is a good value.

MIDI Import Pattern Length

Shows the number of rows per pattern that OpenMPT will force on the imported MIDI track.

Auto Save

Auto saving is used for keeping backups for the current open track(s). A track is only saved automatically if changes were made since the last save or autosave. You will be notified if Auto Save fails for any reason, and Auto Save will be disabled. This page will be opened so you can make adjustments.

Auto Save Options

- **Enable Auto Save**: Checking this box enables the Auto Save features below. Save Interval: Shows the number of minutes between automatic saving.
- **Backup Count**: Shows the number of auto saves that will be kept per file.
- **Backup Location**: Indicates where the autosave files will be stored. Clicking on the "original directory" button will store it in the same folder as the song; Auto saves of new, unsaved files are stored in OpenMPT's settings directory. Clicking the other radio button allows you to choose another directory, either by entering the folder's path or clicking on the Browse button on the right to locate the folder.

Auto Save tab of the settings dialog

- **File Name Format**: This shows the way the auto save file will be named. It is not editable.
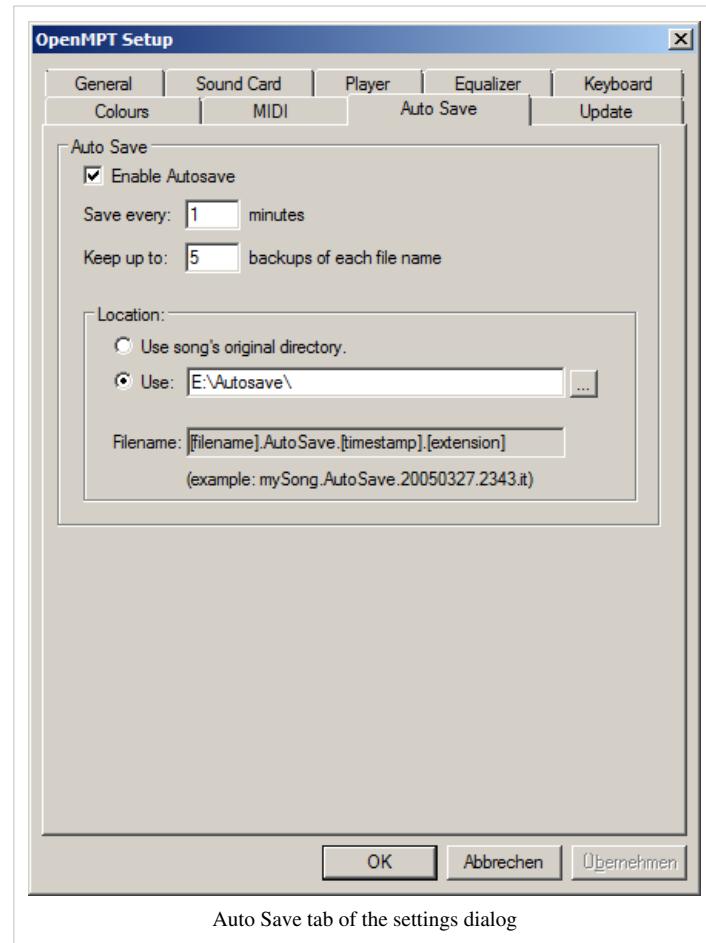
Update

OpenMPT is being developed constantly and new versions are released every few months. Thus, if you are using OpenMPT on a computer that is connected to the internet, you might want it to check for new versions automatically. If an update is found, it is never installed automatically, so you can decide on your own if you want to upgrade or not.

Check for Updates

Choose an update interval that suits your taste from this list. It is recommended to check for updates weekly, but if you are running OpenMPT on a machine without internet access, you can completely disabled automatic update checks here. In that case, you will have to look out for new updates by yourself. ;-)

Privacy Settings

In this section, you can decide whether an unique (but anonymous) ID should be sent with every update check or not. The ID is merely used to get rough statistics about the number of

Update tab of the settings dialog

people that make use of this feature. However, the ID cannot be linked to you our your computer in any way, as it is completely random and does not contain any information about you or your computer setup.

Advanced Settings

Here you can change the URL under which OpenMPT will look for new versions. You should not change this address under normal circumstances. However, brave and eager testers may want to change the address to http://update.openmpt.org/check/testing/$VERSION/$GUID in order to receive update notifications for test builds. Please note that is is generally **not** recommended to use test builds, as it is not guaranteed at all that they are stable (**data loss cannot be excluded**) or that they behave the same as final versions - for instance, pattern effects might be treated differently (buggy) in a test version but not in a final version. In that case, the buggy behaviour will not be emulated in future releases.
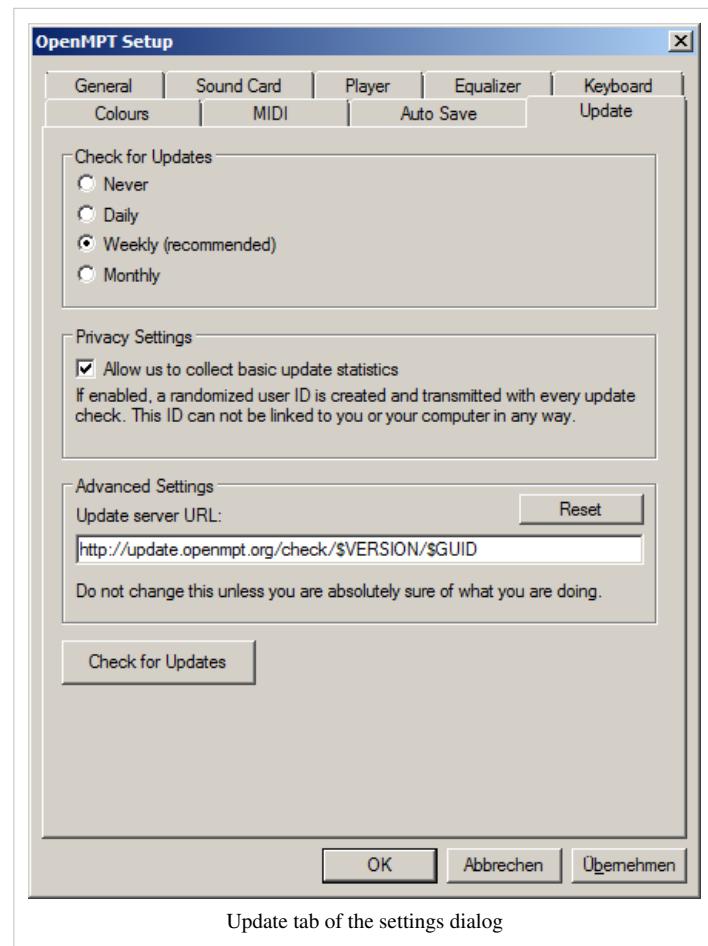
Main Window

Menus

In all menu screenshots, the keyboard shortcuts are shown but may be different from your own. You can configure these in the Keyboard setup.

File

- **New**: Creates a blank track. You can select the track type from the sub menu. When using the shortcut for a new track, OpenMPT defaults to an IT track of no other documents are open, and if there are other documents open, it will default to the track type of the currently active document.
- **Open**: Loads one or more tracks you want to open and adds them to the Recent Files list. OpenMPT can open a variety of file formats, listed in the Module formats section.
- **Open Template**: Provides a list of modules that have previously been saved as templates.
- **Close**: Closes the currently active track. If changes were made (shown by an asterisk in OpenMPT's title bar), you will be prompted if you wish to save the changes.

File Menu

- **Close All**: Closes all open tracks. You will be prompted to save any modified tracks.
- **Save**: Saves the file in its current directory with its current name. If the file is new and was never saved, this command is the same as the "Save As" menu item.
- **Save As**: Opens a dialog where you can specify a location you wish to store the file to.
- **Save as Template**: Saves the currently open module as a template module.
- **Export as WAV**†: Exports the track to a .wav audio file.
- **Export as MP3**†: Exports the track to an .mp3 audio file.
- **Export as MIDI**: Exports the track to a .mid sequencer file.
- **Compatibility Export**: Exports the track to a "pure" version of the track format. See the section on Compatibility Export for more details. The track itself is not saved nor closed in its current state.
- **Import MIDI Library**: Shows the Open File dialog so you can load a new default MIDI library, which will overwrite your current MIDI library in the Folder Tree.
- **Add Sound Bank**: Shows the Open File dialog so you can append another Sound Bank folder into the Folder Tree.
- **Recent Files List**: Lists the last 10 files that were opened in OpenMPT. The shortcut keys are the digits 1 to (1)0 (pressed with the Alt key).
- **Exit**: Executes the Close command on all files (see above), saves all settings and quits ModPlug Tracker.
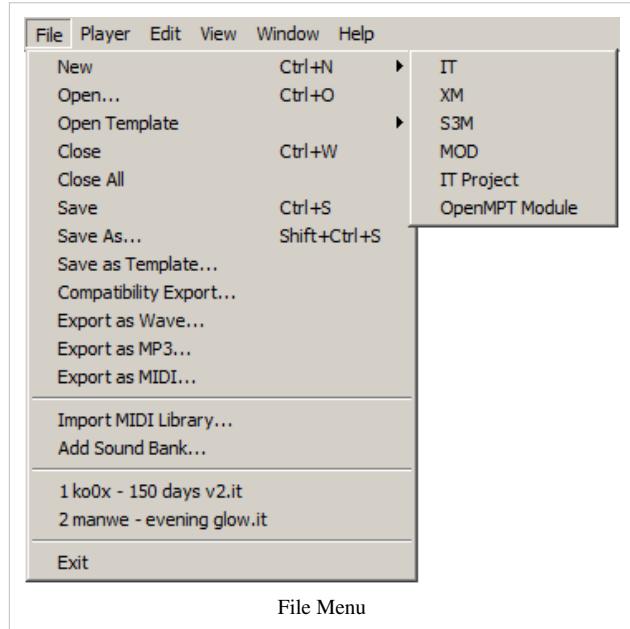
† Many plugins do not reset their audio buffers (even though they are required by the VST standard to do so) when playback is stopped or paused. In this case, if you attempt to export audio after stopping playback, any "leftover"

audio (e.g. a trailing reverb) will be output to the file at the beginning of the audio file. To remedy this, empty the buffer by playing an empty pattern or by clicking on a sample or instrument preview button. Then export to an audio file.

Player

Player Menu

- **Pause / Resume**: Pauses the song. All audio processing is stopped; when resuming playback from Pause, audio processing is restarted from the last cursor position in the pattern editor.
- **Play from Start**: Resets the playback position to the beginning of the first pattern in the Order List, and begins playback.
- **Stop**: Stops all audio processing and resets the playback position.
- **Pause**: Pauses the song by stopping audio processing, but NOT resetting the playback position.
- **MIDI Record**: Allows MIDI messages to be received and placed in the current pattern at the active row according to the message received. See the section on MIDI Setup, MIDI Mapping, or MIDI in ModPlug for more details.
- **Estimate Song Length**: Displays a window which shows an estimate of the song Length. If a module contains several ("hidden") songs in one order list, only the first song is considered. When working with multiple sequences, only the current sequence is considered in the calculation.
- **Approximate Real BPM**: Displays a window which shows an estimate of the actual tempo in terms of Beats per Minute (BPM), based on Tempo Mode, the tempo value, and the ticks-per-row value (speed).

Edit

Edit Menu
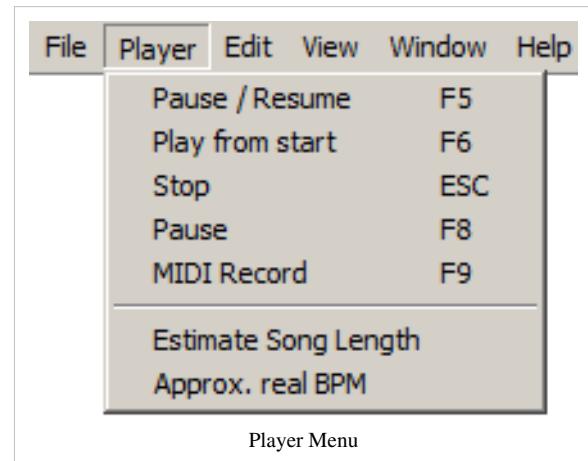
- **Undo**: Repeals the last action taken. This only occurs in the Pattern Editor and Sample Editor. There is a limit to the number of Undo steps — 100,000 for Pattern edits and 100,000 for edits of **each** sample. Pattern navigation and selection cannot be un-done. For samples, you can also limit the amount of RAM used by the Undo buffer in the INI file.
- **Cut**: Executes a Copy action, then erases all data from the selected area.
- **Copy**: Copies the selection to the clipboard.
- **Paste**: Transfers a copy of the clipboard contents where the cursor is located, overwriting any data within the bounds of the pasted data. For pattern data, the clipboard content will be pasted in the same cell as the cursor location, even if the cursor is not in the first column of the event. For sample data, pasting replaces the complete samples, i.e. you cannot paste **into** an existing sample.
- **Paste Special**: Opens a sub menu where you can choose alternate forms of pasting data into patterns, as described in the Pattern Editor manual.
- **Select All**: Selects all data in the location of the input focus (the Pattern Editor or the Sample Display). The cursor remains in the same location.
- **Cleanup**: Opens the Cleanup Manager dialog, which allows you to set various options to remove, reset, or re-arrange track elements.
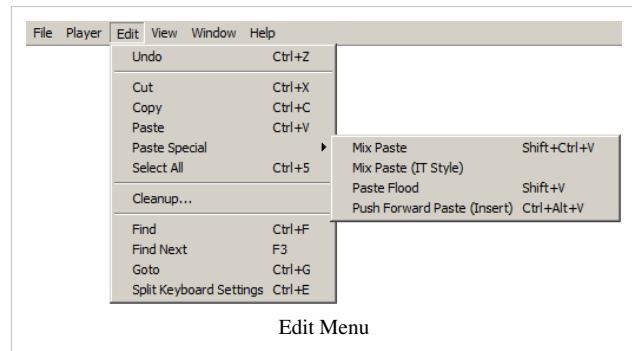
- **Find**: Opens the Find & Replace dialog, where you can search for data and replace it if necessary.
- **Find Next**: Finds the next occurrence of data according to your previous filters in the Find dialog.
- **Go To**: Opens a dialog where you can choose to navigate to another pattern location.
- **Split Keyboard Settings**: Opens the Keyboard Split dialog.

View

View Menu

- **General Tab**: Displays the General Page, setting the input focus to the selected text of the first channel's label.
- **Patterns Tab**: Displays the Patterns Page, and setting the input focus to the most recent cursor position in the Pattern Editor.
- **Samples Tab**: Displays the Samples Page.
- **Instruments Tab**: Displays the Instruments Page.
- **Comments Tab**: Displays the Comments Page.
- **Main**: Toggles the display of the Main Toolbar, remembering its position.
- **Tree**: Toggles the display of the Folder Tree View.
- **Setup Options**: Shows the Setup Options dialog at the last open page.
- **Plugin Manager**: Shows the Plugin Manager dialog.
- **Channel Manager**: Shows the Channel Manager dialog.
- **Song Properties**: Shows the Song Properties dialog.
- **MIDI Mapping Options**: Shows the MIDI Mapping dialog.
- **Edit History**: Shows the Edit History dialog.
- **Find OpenMPT Hacks**: Lists the non-standard (non-compatible) modifications in the current track introduced by ModPlug Tracker. This helps to show what needs to be changed so that other trackers or players can play the file correctly.
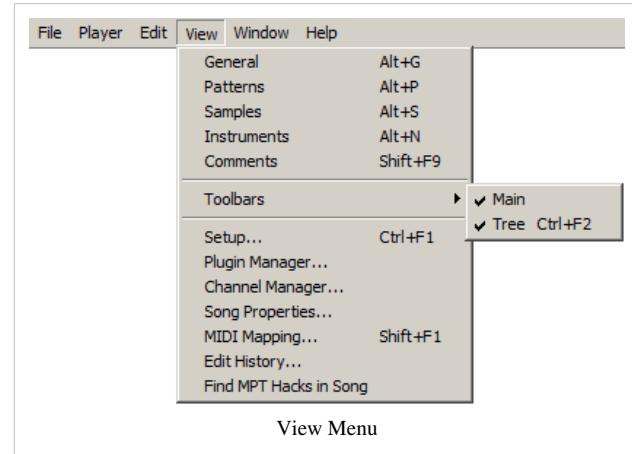
Window

Window Menu

New Window: Opens an alternate window of the current track using the same page display.

- **Cascade Windows**: Resizes and "cascades" all open windows (by superimposing one over the other diagonally) so that any window can be brought to the front with a mouseclick on that window.
- **Tile Windows Horizontal**: Resizes all open windows so that horizontally they equal the width of OpenMPT's window, and vertically they share an equal amount of space between the Menu Bar and the Status Bar.
- **Tile Windows Vertical**: Resizes all open windows so that vertically they equal the height of OpenMPT's window, and horizontally they share an equal amount of space between the Folder Tree and the right side of OpenMPT's window.
- **Arrange Icons**: All minimized child windows are moved back to the lower-left corner of the main window, where they are located by default.
- **Split**: Allowes a page to be split horizontally. Selecting this menu item centers the mouse cursor in the screen and "grabs" the divider so you can reposition it.
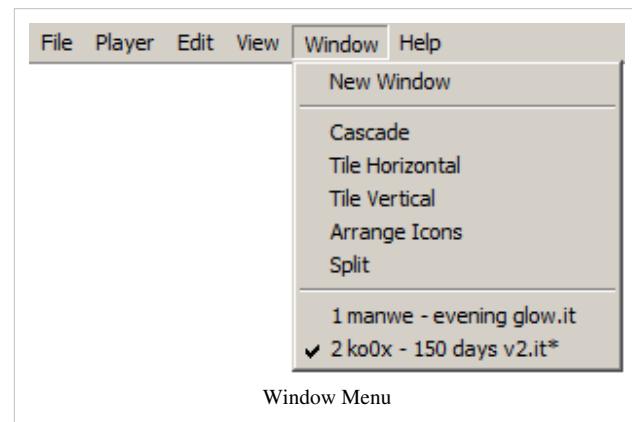
- **Current Open Files List**: Shows all open tracks in the order they were loaded. The one with the check mark is the "current" track to which all the relevant menu items will be applied.

Help

- **Help**: Opens the help file.
- **Report a Bug**: Opens the OpenMPT Issue Tracker in your default Internet browser, where you can report a bug. (Obviously this only works if your computer is online.)
- **Example Modules**: Shows a list of example tunes that are shipped with OpenMPT.
- **Show Settings Folder**: Opens the folder containing all the configuration files.

Help Menu

- **OpenMPT Website**: Opens the OpenMPT front page in your default Internet browser (openmpt.org).
- **Web Resources**: Opens a list of interesting web resources related to OpenMPT in your default Internet browser.
- **Check for Updates**: Manually runs the online update check.
- **About OpenMPT**: Shows OpenMPT's About window that displays the credits for OpenMPT and links to its website.
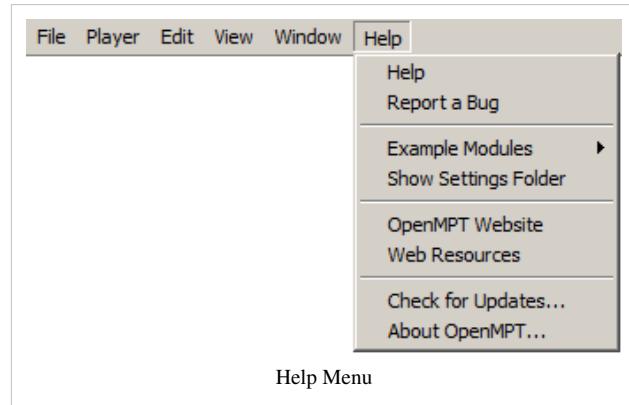
Tree View

The Tree View, or Folder Tree, is a place for all of your resources of your song in a single and easy view, here you have access to your patterns, sequences, samples, instruments, plugins and comments. In addition you also have access to your default instrument and sound library library, this is also available when you do not have any songs loaded. The Tree view can be found on the left side of the main window. If it is not visible, you can enable it from the View menu, or with the default keyboard shortcut Ctrl+F2.

The tree view consists of two halves, which can be adjusted in size by dragging the horizontal splitter bar that separates them. Also, the width of the tree view can be adjusted by dragging the vertical splitter bar on the right side of the view. That way, more or less space can be given to song windows.

Song Folders

Whenever you load a song or create a new song, a folder with the track's name is added to the Tree view. If you have multiple songs loaded, you can switch between them by clicking on the song's root folder. When you click the + icon left of the root folder, you get access to its child folders:

Upper half of the Tree View

- **Sequence**: This folder contains one or more order lists (sequences). You can remove and rearrange sequence items by drag'n'dropping them. Double-click an item brings up the pattern editor, where you can edit the selected pattern. If you are working with the MPTM format, it is possible to switch to, add and remove sequences by right-clicking the appropriate folder items. This feature can be handy when you want to write several songs that share the same set of instruments, for example for composing game music.
- **Patterns**: Gives you a list of all the patterns used in your file, and also lists unused patterns. Double-clicking an item brings up the pattern editor, where you can edit the selected pattern. You can also right-click any item to delete the corresponding pattern.
- **Samples**: Gives you the list of all the samples loaded in your file. Double-clicking an item brings up the sample editor, where you can edit the selected sample. Right-clicking an item also gives you the option to preview or delete samples. If you are not working in instrument mode, you can also (un)mute and solo a sample from the context menu. A little green icon can indicate playback (either because the sample is triggered in your song, or when previewing it from the Tree view or sample editor) if the appropriate option is enabled in the General settings.
- **Instruments**: Similar to the sample folder, this folder gives you an overview of all instruments. The same options including muteing and soloing instruments are available, and playback status of instruments can be indicated by a little green icon. Additionally, when working with ITP files, you can set instrument paths and save instruments from the context menu using the "Set Path" and "Save" options respectively.
- **Comments**: Double-clicking this item brings you to the comments editor.
- **Plugins**: Loaded plugins are listed in this folder. A speaker icon indicates an effect plugin, a keyboard icon indicates an instrument plugin. Plugins can be muted and edited by using the "Bypass" and "Edit" options respectively from the context menu.
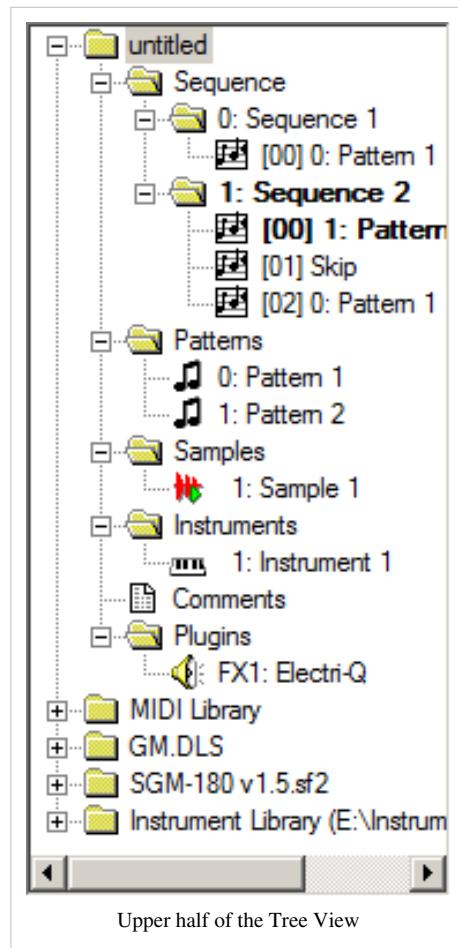
MIDI Library

The MIDI Library is used when loading MIDI files. As MIDI files only contain MIDI protocol data and no samples or other sound generators, it is necessary for a host application to connect MIDI program changes with some kind of sound generator. The MIDI Library contains a set of General MIDI instruments that are used when importing MIDI files.

By default, those sounds are extracted from DirectX's default soundfont (GM.DLS), however you can exchange any of the MIDI programs in the MIDI library to make them suit your own taste. This way, you can influence how imported MIDI files sound, but you can also use the MIDI Library as some kind of custom sample library for your own sounds.

By double-clicking a library item, you can import a new sample or instrument for this slot. You can import .xi (FastTracker 2 instruments), .pat (GF1 Patches), .wav (Wave files), .iti (Impulse Tracker Instruments), .dls (Downloadable Sounds) and .sf2 (SoundFont 2.0 banks) files. In the latter two cases, the appropriate patch is loaded automatically. You can use drag'n'drop to import MIDI Library items into the sample or instrument editor.

You can replace the whole library at once by right-clicking one of the folders and choosing **Import MIDI Library**. You then can load for example a DLS or SF2 file, which can replace the whole existing library or just fill in missing slots.

Note: ModPlug does not support multilayered SF2 instruments at this moment, so if you choose to load a complex soundfont, ModPlug will only load one layer.

If you want to work with multiple MIDI Libraries, you can right-click any of the MIDI Library folders to import or export the MIDI library to / from a text file.

Sound Banks

Sound Banks are collections of samples, often sorted in categories defined by the General MIDI standard. Additionally to the default (but poor-sounding) sound bank GM.DLS that is shipped with DirectX and is automatically detected by OpenMPT on Windows systems, you can add new sound banks by right-clicking an empty spot of the Tree view and choosing "Add Sound Bank...". The following formats are supported:

• SoundFont 2.0 (.sf2)
• SoundFont 1.0 (.sbk)
• Downloadable Sounds (.dls)
• Miles Sound System (.mss)

Instrument Library

The Instrument Library is made up of two parts — the "Instrument Library" folder in the upper half of the tree view, and the entire lower half. The upper half is used for navigating around your file system and the lower half is used to display folder or module contents.

When expanding the "Instrument Library" folder, you get to see a list of all drives and all child folders of the current library folder. Double-click the ".." folder to navigate one folder up in the file system hierarchy, and double-click any other folder or drive to change to that folder or drive. Module files that OpenMPT can open are marked in green - you can imagine them as virtual folders in your instrument library, and double-clicking a module will show all its samples and instruments in the lower half of the tree view — just like if it was a real folder. You may also right-click a module and choose **Edit Song** to open the entire module instead of just importing instruments from it.

The lower half of the tree view is dedicated to displaying folder contents. The first item of this list tells you which folder or module you are currently browsing. By default, only sample and instrument files are shown in this view; if you want to list all folder contents, right-click the first item and choose **Show All Files**.

You can preview any instrument by double-clicking it. You may also press note keys just like in the sample editor to play it at a different pitch. If you want to load a sample or instrument from the instrument library into a module, simply drag′n′drop it onto the sample or instrument view.

The Instrument Library is not updated live. If you have added new instruments to the folder that is displayed in the lower half of the tree view, you have to right-click the list and choose **Refresh** to reload the folder contents.

General

The General Tab holds the general global settings of each song and is also used to set up the plugins that are used in a song. Many of these settings can be changed using a coarse slider, a text box to enter a precise value or the spin button next to the text boxes to increase or decrease a value. Some options are not available in all module formats; if that is the case, their controls are simply greyed out and cannot be accessed.

The General Tab is divided into two halfs. They are divded by a vertical splitter bar, which can be dragged to change the size of both views.

General Tab
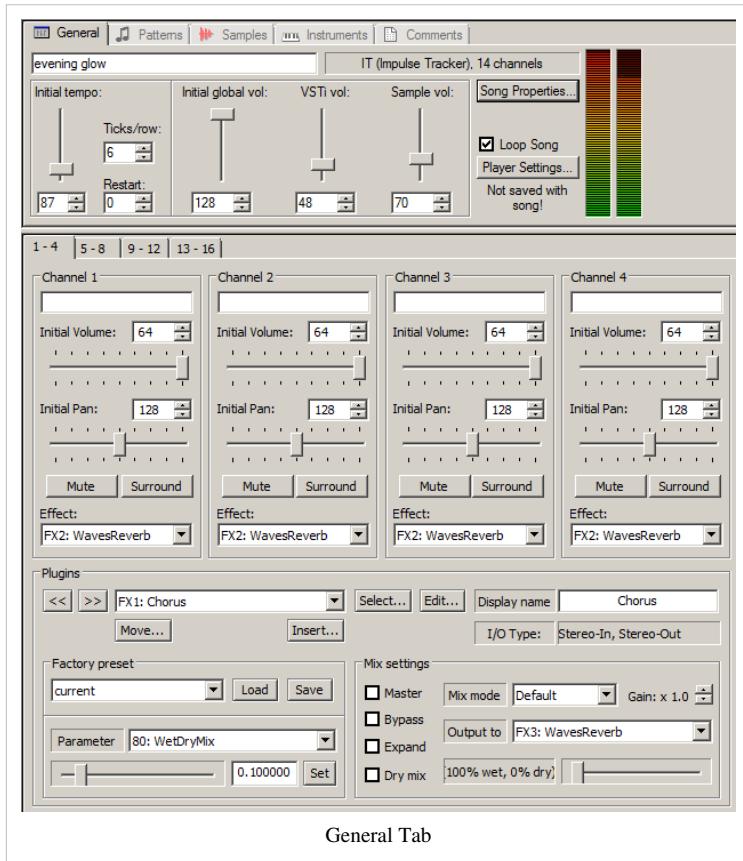
Song Setup

Miscellaneous

- **Track Name**: In the first text box, you can enter the name of your song. Depending on the module format used, the length of this text field is limited.

- **Format**: Next to the track name, you can see which module format the current song is in, as well as the number of pattern channels. To change either of them, click the Song Properties button.

- **Loop Song**: If this box is checked, your song will restart from the restart position and loop if the end is reached. This is a global setting rather than a per-song setting and is applied to all tracks you play in OpenMPT.

- **Player Settings**: This button is a shortcut to the Player Tab of the Setup Window. Again, settings that are made in this setup are global settings rather than per-song options.

- **VU Meters**: The VU Meters show the level of the left and right master output channel during playback. Their colour can be configured in the Colour Setup.

Tempo / Restart

- **Initial Tempo**: The track's initial Tempo value. The effect of this setting is determined by the Tempo Mode, which can be set in the Song Properties dialog. This setting can also be changed during playback using the Txx command in MPTM / IT / S3M and the Fxx command (with xx ≥ 20h in XM and xx ≥ 21h in the MOD format) in XM / MOD tracks.
- **Initial Speed**: The track's initial Speed value. The effect of this setting is determined by the Tempo Mode, which can be set in the Song Properties dialog. This setting can also be changed during playback using the Axx command in MPTM / IT / S3M and the Fxx command (with xx < 20h in XM and xx < 21h in the MOD format) in XM / MOD tracks.
- **Restart**: If **Loop Song** is enabled, playback will resume at this order list position when the song end is reached.

Volume Settings

- **Initial Global Volume**: The track's initial Global Volume value, which is the global amplification of a song. The exact effect of this setting depends on the Mix Levels, which can be set in the Song Properties dialog. Global volume can be changed during playback using the Vxx command in MPTM / IT / S3M (with xx ranging from 00h to 80h in MPTM / IT and from 00h to 40h in S3M) or Gxx in the XM format (with xx ranging from 00h to 40h).
- **VSTi Volume**: This setting determines the overall amplification of the output of all VST instruments. This setting cannot be changed using pattern effects.
- **Sample Volume**: This setting determines the overall amplification of samples. Too high amplifiaction will saturate or overdrive sample output. This setting cannot be changed using pattern effects. It is the only volume slider available for ProTracker MOD files, but the value is actually not stored such files.

Channel Setup

In the middle of the page is the Channel Setup section, which displays four channels at a time, and allows for editing each channel's initial settings. To browse through all available channels, use the tab control. The track format determines what settings can be modified both initially and during output. The following properties can be set for each channel:

- **Channel Name**: You can assign a name to your channels which is shown in the Pattern Editor and the Channel Manager, to keep your module tidy and help distinguish channels.
- **Initial Channel Volume**: The global volume of a channel. All note volumes are multiplied with this. Channel volume is only applied to samples, not to VST instruments, but since it is applied to samples, it can affect the input of an effect plugin. XM and MOD files do not have a channel volume setting. S3M files can make use of channel volume, but they have no initial channel volume, so this control is greyed out. You can use the Mxx command (with xx ranging from 00h to 40h) in patterns to set the channel volume.
- **Initial Panning**: The channel's initial stereo panning. Unlike the channel volume, this setting is not "global"; panning commands, sample panning and instrument *override* the initial panning. In MOD files, the initial panning is fixed to a Left/Right/Right/Left scheme; XM files do not support initial channel panning due to the fact that every sample in XM files has a forced default panning. Panning can be changed in the patterns by using the 8xx or E8x command (in XM and MOD files) and the Xxx or S8x command in MPTM / IT / S3M files.
- **Mute**: Clicking on this button enables / disables all audio output from this channel.

Notes played in a channel are always processed, but if "Ignore Muted Channels" is set in the General Options page, unmuting a channel will not play a currently running note, instead picking up when a new note is called. Keep in mind that no effects are processed on muted channels in S3M files, so e.g. tempo changes or pattern breaks are not handled on muted channels in S3M files. Also, the channel mute status is only saved in MPTM / IT / S3M files.

- **Surround**: This button toggles the surround panning setting for the current channel. Surround and initial panning are mututally exclusive; if surround is enabled, the initial panning is forced to center. Surround can be reset in the

pattern using a panning command (unless quad surround panning is enabled). In MPTM and IT files, surround can be enabled using the command S91; in the S3M format, the command XA4 shall be used.

- **Channel Effect**: Here you can assign an effect plugin to the current channel. All sample output on this channel is then routed through the effect plugin. Note: While instrument plugins override channel plugins (i.e. if an instrument has a plugin assigned, the sample output of this instrument is **not** routed through the channel's effect plugin), channel plugins are always preferred over instrument plugins when using MIDI Macros.

The channel properties can also be edited directly from the pattern editor by using the Quick Channel Settings dialog.

Plugin Setup

The bottom part of this tab is dedicated to the plugin setup. Here, you can load plugins into your song, configure them, move them, and so on.

General

- **Plugin Slot**: Shows the currently edited plugin; all parameters shown in this section apply to this plugin. Clicking in the field opens a list where you can switch to a different plugin. Clicking on the left / right arrows next to the field changes the current plugin to the previous / next one in the Plugin List. There are 100 available slots where plugins can be placed, and they do not need to be placed sequentially. However, if an output chain is set up, a VST can only output to one farther down the list (with a higher slot number). So for example, a chain can route its audio from slots 1 to 3 to 5, but not 1 to 5 to 3.
- **Move Plugin**: This allows you to move the current plugin to another slot. When moving, you will be shown a dialog box which will allow you to choose an empty slot to move the plugin to. References to this plugin (for example from instruments or channel setup) are updated automatically when moving. However, if a plugin is part of a chain, and the plugin is moved to a slot *after* its output plugin, the chain will be broken ― the Output field (see below) will revert to Default.
- **Insert Slot**: Creates an empty slot *before* the current plugin's place in the list. This will effectively push the current plugin and all those after it in the list down one slot. If a plugin occupies the last slot (#100), it is deleted; **This cannot be undone**, but your are prompted to confirm the insertion in that case.
- **Select Plugin**: Opens the Plugin Manager, where you can select a plugin to put into the current slot, replacing the current plugin if there is one. You can also **delete** the current plugin by choosing "No Plugin" in the Plugin Manager.
- **Edit**: This button opens the Plugin Window where you can edit the plugin's properties.
- **Display Name**: An text field where you can provide a custom name for the plugin. This label will appear in the Channel Header if the plugin is assigned to a channel, or the Plugin Select field in the Instruments page if it is assigned to an instrument, so it can be useful to choose a custom name here if you are using several instances of the same plugin.
- **Input / Output Type**: A description of the type of audio signal going in and out of the plugin (none, mono, or stereo).

Factory Preset

Here you can quickly change some parameters. Usually, the more comfortable way to do this is using the Plugin Window, but some plugins might not expose all parameters through their window. So in that case, you can still edit them here.

- **Preset**: The currently loaded plugin preset, or "patch". The number of available preset slots varies from plugin to plugin, some do not have any presets at all.
- **Load Preset**: Use this to load an existing plugin preset (.fxp file).
- **Save Preset**: Use this to save the current plugin parameters to a plugin preset file.
- **Parameter**: Pick a parameter from this list to edit it using the slider below. You can either drag the slider to adjust the value, or input a parameter using the text box next to it. Use the **Set** button to apply the value you typed into the text box.

Mix Settings

This option group is used to set up the inputs and outputs of the plugin.

- **Master**: When enabled, this plugin is applied to the master audio output.
- **Bypass**: If checked, the plugin is not processed anymore. An instrument plugin will cease to make sound and effect plugins will stop having an effect on the audio that is routed through them.
- **Expand**: This option affects the Dry / Wet setting. Normally, the Dry / Wet ratio ranges from 100% Wet / 0% Dry to 0% Wet / 100% Dry, but with this setting, it ranges from 100% Wet / -100% Dry to -100% Wet / 100% Dry. A negative value means that the phase of the signal is inverted. So if the slider is full left, you get to hear the wet signal as well as an inverted copy of the dry signal,

The "Expand" option changes the behaviour of the Dry / Wet ratio setting.

at the middle you get no output at all (0% Wet / 0% Dry) and if the slider is full right, you get the original signal plus an inverted copy of the dry signal. While being potentially interesting conceptually, this setting is unlikely to be useful musically.

- **Dry Mix**: If enabled, the dry (incoming) signal is always added to the output signal of a plugin, and the Dry / Wet slider only changes the Wet amount — the Dry amount is fixed to 100%. This is most commonly used for plugins that have no Dry / Wet mix settings built in. For example, in a delay plugin with no dry signal, all you get is the later echoes with no original sound, which is not what you normally want. In that case, you can enable Dry Mix to add the original signal.
- **Mix Mode**: This determines how the Wet / Dry ratio affects the output signal. Several options are available:
  - **Default**: No special processing.
  - **Wet Subtract**: The Dry signal is added to the mix, the Wet signal (multiplied with the Wet ratio) is subtracted from the mix.

- **Dry Subtract**: The Wet signal is added to the mix, the Dry signal (multiplied with the Dry ratio) is subtracted from the mix.
- **Mix Subtract**: The Wet signal is subtracted from the mix, the Dry signal (multiplied with the Wet ratio) is added to the mix.
- **Middle Subtract** : The Middle channel is subtracted from the mix, then the dry and wet signal are added normally.
- **LR Balance**: The Wet / Dry ratio is treated as a panning ratio for the signal.
- **Gain**: This adjusts the volume of the plugin from 0.1 - 8.0 in increments of 0.1. This is used to reduce or boost the volume of plugins that are quieter or louder than desired. The default gain is 1.0 (no change in volume).
- **Output To**: Specifies where the plugin's audio and MIDI output is routed to. By default it is combined into the Master Audio route, but you can create a plugin chain by routing it to another plugin as long as its slot number is higher than the current plugin's slot. Note that MIDI events are only routed if an output plugin is specified, i.e. they are not routed to the master.
- **Dry / Wet Slider**: Controls the Dry / Wet ratio of the plugin. The exact meaning of the ratio is determined by the "Expand", "Dry Mix" and "Mix Mode" options described above.

Patterns

The pattern editor is used to assemble your musical compositions. Every module consists of a set of **patterns**, which hold the note data, and one or multiple **sequences**, which are a collection of references to patterns and dictate the playback order of those patterns. The current sequence is always displayed in the **Order List**.

Every pattern is represented by a table, consisting of rows (time) and columns (simultaneously playing channels). All patterns have the same amount of channels that is configurable from the Song Properties dialog, but depending on the module format, the number of rows can also be changed for each pattern in the Pattern Properties.

Pattern Tab

Patterns contain note data for triggering samples and instrument plugins, but they can also contain effect commands that change global parameters such as tempo or volume, plugin automation, pitch-altering effects and many other things. A list of effect commands that can be entered into patterns is available in the effect reference.
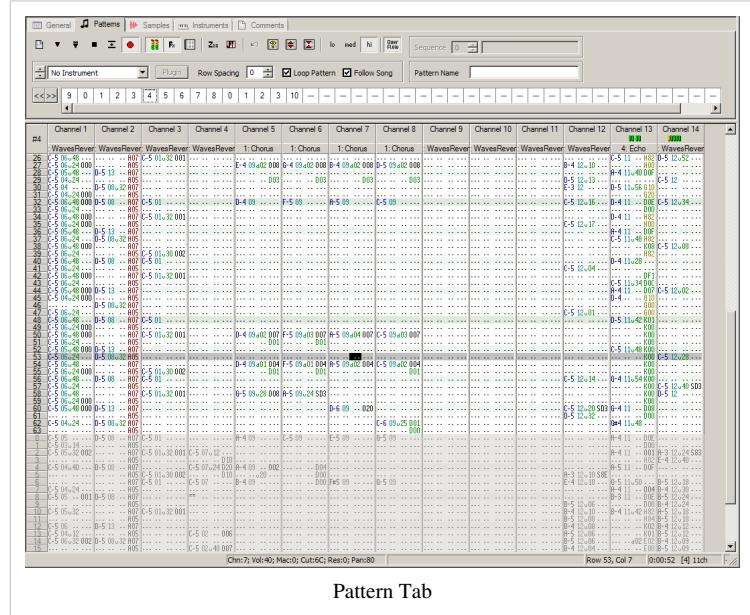
Toolbar

- **New Pattern**: Creates a new empty pattern, using the same number of rows as the current patterns, and adds it to the Order List.
- **Play Pattern**: Starts playback of the current pattern from the current row and loops the pattern.
- **Replay Pattern**: Restarts playback of the current pattern from the first row and loops the pattern.
- **Stop**: Stops playback altogether.
- **Play Row**: Only plays the currently focussed row of the pattern and steps to the next row.
- **VU Meters**: Toggles display of the channel VU meters. The VU meters do not show the actual volume on the channels, but rather the calculated note volume, i.e. the volume level at which the sample is played.
- **Show Plugins**: Toggles display of the channel plugin names below the channel name. Plugins can be assigned to every pattern channel from the General Tab or by right-clicking this plugin name.
- **Channel Manager**: Toggles display of the Channel Manager window.
- **Zxx Macros**: Opens then Macro Configuration dialog.
- **Chord Editor**: Opens the Chord Editor dialog.
- **Undo**: Undoes the last modification to the pattern(s). Changes to the Order List are not covered by this action.
- **Pattern Proprerties**: Opens the Pattern Properties dialog, if supported by the current module format.
- **Expand Pattern**: Doubles the length of the current pattern by adding an additional empty row after every row.
- **Shrink Pattern**: Halves the length of the current pattern by removing every other row.
- **Low Pattern Detail**: Only the note and instrument column are displayed in the pattern editor.
- **Medium Pattern Detail**: Only the note, instrument and volumn column are displayed in the pattern editor.
- **High Pattern Detail**: All channel columns are displayed in the pattern editor.
- **Togle Overflow Paste**: When enabled, pasting will continue to the next pattern if the data overflows the current pattern.

Next to the toolbar is the **sequence selector** which is used to switch to another sequence or change the name of the current sequence.

Edit Controls
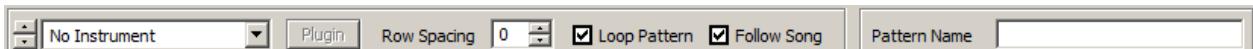
- **Main Instrument**: Shows the instrument (or sample) that is used to input notes. If keyboard split is used, the main instrument is used to play the upper part of the keyboard.
- **Plugin**: If the main instrument is associated with a plugin, the plugin's editor can be opened from here.
- **Row Spacing**: The amount of rows that is skipped after entering a note into the pattern. If Row Spacing is set to 0, the cursor stays in the same row, if it is set to 1, it advances to the next row, etc.
- **Loop Pattern**: If checked, pattern playback will restart from the top of the pattern if the end of the pattern is reached.
- **Follow Song**: If checked, the cursor position moves with the currently played row as the pattern plays.
- **Pattern Name**: Here you can change the name of the current pattern.

Order List
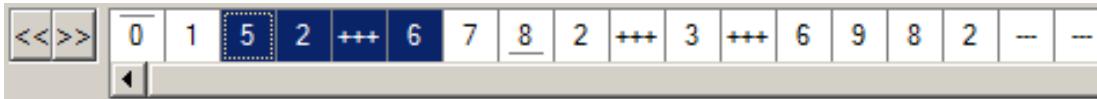
The Order List contains the pattern references of the current sequence. It determines in which order the patterns are played. There are several types of Order List entries:

- **Pattern reference**: Represented by **numbers**. A pattern can be played several times if its reference number is used in multiple oder list slots.
- **Separator pattern**: Represented by **+++**. Separator patterns are simply skipped, i.e. they have no content. They can be used to keep your Order List tidy and structured. You could, for example, add a separator pattern after each group of four patterns, or after each transition from verses to the refrain, etc...
- **Stop pattern**: Represented by **---**. If a stop pattern is encountered, playback is continued at the Restart Position if Loop Song is enabled or stopped otherwise.

It is possible to put several "songs" into the same Order List by separating them through stop patterns (and / or by putting a position jump effect at the end of the last pattern of each "song"). This technique is commonly used in game music, where the same set of instruments and samples is used for several related songs.

The pattern play order can be modified by *position jump* effect commands.

Usage

- **Currently edited patterns** (shown in the pattern editor below the Order List) are marked with a **dashed border**.
- **Currently played patterns** have a line above the pattern reference number.
- **Queued patterns** are underlined. A pattern can be queued and de-queued by middle-clicking or Ctrl-clicking its pattern reference. Queued patterns are played as soon as the currently played pattern has finished played, i.e. when the play cursor has reached the last line of that pattern or when a position jump / pattern break command is encountered in that pattern.
- **Locked patterns** are shown with a grey background. Patterns can be locked from the context menu.
- **Non-existent Patterns** are greyed out. That is, if there is a pattern 8 in the order list, but the module only has 4 patterns, pattern 8 would be greyed out.
- **Order selections** can be made by clicking on the first order and Select-clicking (by default, the selection key is Shift) on the last order that should be selected. If only one order should be selected, the second step can of course be omitted. It is also possible to create order selection using the keyboard by holding down the select key (by default, this is the Shift key) and using the cursor / home / end keys.
- Orders can be **moved** and **copied** by dragging the order selection around using the mouse. By default, the order selection is moved, but it can also be copied to the new selection if the selection key is held down when dropping the order selection (releasing the mouse button).
- Order items can be entered using the **keyboard**. To add or edit a pattern reference, simply enter the number of the pattern in one of the Order List slots. Separator pattern can be added by pressing S and stop patterns by pressing Space.
- Patterns can be dragged from the current module's song folder in the Tree View to the order list. The pattern reference is then inserted at the drop position.

Order List Context Menu

Right-clicking the Order List offers these options:

- **Insert Pattern**: Inserts the selected pattern reference numbers after the current selection.
- **Insert Separator**: Inserts a separator pattern (+++) at the selection position, if it is available in the current module format.
- **Remove Pattern**: Removes the selected patterns from the Order List. Note that the actual patterns are *not* deleted; only the references to those patterns are removed.
- **Create New Pattern**: Places a new blank pattern in the Order List where you clicked. The new pattern will have the same number of rows as the selected pattern.
- **Duplicate Pattern**: Copies the contents of the selected patterns into new patterns, and inserts the numbers of those new patterns after the selected patterns.
- **Copy Pattern**: Copies the pattern data of a single pattern (the selected one) into the clipboard.
- **Paste Pattern**: Places the pattern data in the clipboard into the selected pattern, replacing any data in the pattern.
- **Copy Orders**: Copies the selected pattern numbers (Orders) into the clipboard. This option appears only if multiple orders are selected.
- **Cut Orders**: Copies the selected Orders into the clipboard and removes the selection from the Order List. This option appears only if multiple orders are selected.
- **Paste Orders**: Pastes the Orders from the clipboard at the selected Order List position.
- **Pattern Properties**: Opens the Pattern Properties dialog, if supported by the current module format.
- **Sequences**: This sub menu is only available in MPTM files, and you can choose from the following items:
  - **Sequence List:** The first items are a list of all the Sequences in the module. Selecting one switches to that Sequence.
  - **Duplicate Current Sequence:** Creates a new Sequence at the end of the Sequence List, and copies the Orders of the current Sequence into it.
  - **Create Empty Sequence:** Creates a new Sequence at the end of the Sequence List without any Orders.
  - **Delete Current Sequence:** Deletes the current Sequence, but not any Patterns that it may contain. There is no Undo for this action, so you are prompted for confirmation after selecting this option.
- **Lock Playback to Selection:** Song playback is locked to the patterns in the current order selection. Locked playback positions are greyed out. Manually selecting a different pattern for playback will remove the lock.
- **Unlock Playback:** If playback has been limited to an order selection before, the playback lock can be removed here.
- **Render to Wave**: Opens the Wave Export dialog for the selected patterns.

Pattern Editor

Overview

Every pattern consist of a number of rows a and channels. Channels are divided into several columns: Note Column, Instrument Column, Volume Column, Effect Column. By default, the currently edited cell of the pattern is highlighted in black, and the respective row is highlighted in dark grey. If follow song is disabled and you have a song playing, the currently played row is highlighted in bright yellow. By default, the song's time signature is indicated by light grey row highlights; the first row of each beat and measure is displayed in a darker colour.
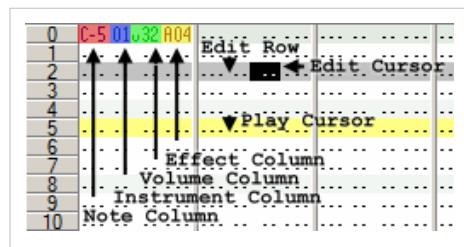
Note Column

The **Note Column** is used to trigger notes and to stop them in one way or another. Note events consist of a key and an octave, for example "C-5" (which is the Middle-C). By default, the "QWERTY" keyboard row triggers the fourth octave, the "ASDF" row triggers the fifth octave and the "ZXCV" row triggers the sixth octave. There are also more "traditional" keymaps in Fasttracker 2 and Impulse Tracker style available from the Keyboard Settings Dialog if you want to try a different layout. You can use the numeric keys to access other octaves or use Ctrl+(Shift)+A/Q to transpose a note up or down by a tone or a full octave. The available note range depends on the format used.

Depending on the song format, several ways are available to stop a playing note from the note column. These actions affect sample playback, instrument envelope playback and VSTi playback in various ways described in the following table.

Action	Sample Properties	Instrument Properties	VSTi Properties
^^ (**Note Cut**)	Instantly cuts playing sample	Instantly stops instrument's envelopes	Stops all notes of the playing VSTi, send MIDI All Notes Off
== (**Note Off, IT / MPTM**)	Releases the sample's sustain loop	Releases the instrument envelopes' sustain loops	Sends Note Off
== (**Note Off, XM**)	Instantly cuts playing sample iff associated instrument has no volume envelope	Releases all envelopes' sustains points and fades the sample out	Sends MIDI Note Off
~~ (**Note Fade**)	—	Fades out sample	Sends MIDI Note Off

Instrument properties are only applied if the song has any instruments. This means that for example ~~ does nothing in sample mode, because Fade-Out is an instrument property.

As the MOD format supports none of the actions described in the table, the only ways to cut a playing sample in this format is to use a volume effect (`C00`) or note cut effect (`EC0`).

Instrument Column

A note alone will of course not produce any sound, so in order to tell the program which instrument or sample should be played with the note, the instrument's (in instrument mode) or sample's (in sample mode) index must be entered next to a note. For example, `C-5 01` will play the Middle-C of the first sample or instrument. If there is no instrument number next to a note, the previously used sample or instrument is recalled. Lone instrument numbers (without a note) will reset the instrument's or sample's properties like volume (this is often used together with the volume slide effect to create a gated sound). In the IT / MPTM format and the MOD format (if ProTracker 1.x mode is enabled), you can switch to a different instrument this way without having to enter the same note again. This is often used in chiptunes to create pulse width modulation effects.

Editing

Navigation in the pattern happens by using the mouse or the appropriate cursor keys. Combinations of Ctrl, Alt and Cursor / Home / End keys can be used to navigate by beats and measures in the default key configurations.

By default, you can use shift to draw pattern selections. Selections can be moved, copied, amplified, transposed, interpolated, doubled or halved in size. Most editing actions are available either from the context menu or through shortcuts.

Paste Modes

The default paste mode overwrites the paste area completely, so if the copied pattern data contains empty cells, they will overwrite any existing pattern data. However, there are several other ways to paste data, available from the **Paste Special** context menu:

- **Mix Paste**: Transfers a copy of the clipboard contents where the cursor is located, overwriting any fields within the bounds of the pasted data **only if** there is no data in the correlating fields. The difference between **Mix Paste** and **Mix Paste (IT Style)** is that the former overwrites effect parameters if they are 00, while the latter leaves effect commands untouched, even if they have a 00 parameter. Also, the first three columns (note, instrument and volume) are seen as one entity when using IT Style, so if any of the three contains some data in the source channel, none of the two other columns are ever overwritten.

  Have a look at the graphic on the right for a better understanding of the two Mix Paste modes:
  The first channel is the target channel in which we will be mix-pasting the clipboard data (second channel). In the third channel, you can see the result of a **Mix Paste** action, and in the fourth channel, we have used **Mix Paste (IT Style)** instead. See rows 4, 8, 13 and 14 for the differences.

- **Paste Flood**: The same as standard paste, except that the pasted data is continually pasted until the end of the pattern is reached (ignoring Overflow mode).
- **Push-Forward Paste**: **Inserts** the data into the pattern rather than overwriting it, pushing all data it affects farther down the pattern. Any data at the end of the affected channels is lost.

Quick Cursor Copy and Paste

In the Pattern Editor, OpenMPT also makes use of its "Quick" clipboard, which can hold a copy of a single pattern event. For example,

C-5	01	v32	A04

shows the four columns of a pattern event that are stored in the Quick clipboard. You can quick-copy every column by placing the cursor appropriately and using the Quick Copy keyboard shortcut (there are no other means of using this feature). To re-use the data, place the cursor in any of an event's four columns and use the shortcut key for quick-paste; the data in the Quick clipboard will be pasted in that field only (except if the cursor is in the note column, in which case the note and **also** its instrument will be pasted). You can only copy and paste in one field at a time.

Channel Header Context Menu

- **Mute Channel**: Disables all audio output from this channel. In the S3M format, this also prevents any global effects (e.g. tempo changes) from this channel to be executed.
- **Solo Channel**: Mutes all channels except this one.
- **Unmute All**: Enables audio output from all channels.
- **Transition Actions**: Will apply one of these actions the next time the playback pointer is at the first row of the next-played pattern. The actions are Mute (disable audio from the selected channel), Unmute All (enable audio from every channel), or Solo (disable audio from all except the selected channel).
- **Reset Channel**: Stops the processing of all notes in this channel, as well as reverts to the initial channel settings, such as those for pan position, volume, etc.
- **Record Select**: Toggles this channel for the first pattern record group.

- **Split Record Select**: Toggles this channel for the second pattern record group.
- **Duplicate This Channel**: Adds a new channel to the module and carries over all note data from the selected channel to this new channel.
- **Add Channel**: Adds an empty channel before or after the selected channel.
- **Remove Channel**: Removes the selected channel or opens a dialog from which you can select the channels to remove.

Middle-clicking or Ctrl-right-clicking a channel header brings up the Quick Channel Settings dialog, which can be used to adjust the channel's initial volume and panning properties as well as updating its name.

Pattern Context Menu

Many of the menu items in this contextual menu may not be available / visible based on what the selection contains. To show all menu items, even if they do not apply, check the "Old-style Pattern Context Menu" option in the General page of the Setup dialog; the unavailable items will be greyed out.

- **Select Column**: Select all data within the selected channel.
- **Select Pattern**: Select all data within the current pattern.
- **Cut**: Executes a Copy action on the selected region, then erases all data from it.
- **Copy**: Copies the pattern selection to the clipboard.
- **Paste**: Transfers a copy of the clipboard contents where the cursor is located, overwriting any data within the bounds of the pasted data. This will begin in the same event as the cursor location, even if the cursor is not in the first column of the event.
- **Paste Special**: Various other paste modes are available from this sub menu. See the Edit menu reference for the differences.
- **Undo**: Repeals the last action taken. Navigation cannot be un-done.
- **Clear selection**: Erases all data in the selected region
- **Interpolate Effect**: Interpolates the effect data between the first and last row in the effect column of the selection if they contain the same effect, filling in any blank fields in the affected cells. If there is no effect on either the first or last row, the effect value on the last or first row respectively is repeated throughout the whole selection.
- **Interpolate Volume Column**: Interpolates the effect data between the first and last row in the volume column of the selection in the same fashion as "Interpolate Effect".
- **Interpolate Note**: Interpolates between the notes in the first and last row in the volume column of the selection in the same fashion as "Interpolate Effect", with the difference that existing notes are overwritten.
- **Transpose**: Changes the pitch of all notes within the selection, up or down an octave, or up or down one note.
- **Change Instrument**: Assigns the current instrument (shown in the Main Instrument field) to **all** notes within the selection (even if the selection does not include the instrument column). This will override the alternate instrument applied from a keyboard split. (There is no way to apply the alternate instrument based on the note using a keyboard shortcut or contextual menu.) This menu item will appear only if the right-click is on a note event.
- **Amplify**: Opens the Amplify dialog, which can be used to amplify and fade the current cell or a whole selection by inserting the appropriate volume commands.
- **Visualize Effect**: Opens the Parameter Editor window for visualizing either the effect column data or the Parameter Control Event data in the current selection (so will not work if no selection has been made).
- **Change Plugin:** From this menu, you can select the plugin for a Parameter Control Event to control. This menu item is only available if the cursor is placed on a Parameter Control Event.
- **Change Plugin Parameter:** From this menu, you can select a plugin parameter that should be automated. This menu item is also only available if the cursor is placed on a Parameter Control Event.
- **Toggle Plugin Editor:** Opens the Plugin Window of the plugin that is associated to the selected Parameter Control Event.

- **Grow Selection**: Extends the selection by inserting a blank row after every row in the selection, so the length of the selection is doubled. This will overwrite any rows in those channels below the selection.
- **Shrink Selection**: Shrinks the selection by merging row pairs into a single row in the selection, effectively halving the length of the selection.
- **Show Row Play Time**: Displays an estimate of the time from the song start to the selected row.
- **Insert Row**: Inserts one row at the top row of the selection in every selected channel, shifting all rows of the selection down by one row, which deletes the last row in the channel.
- **Delete Rows**: Deletes the selected rows in the selected channels, shifting the rows below the selection up by the same number deleted and inserting empty rows at the bottom.

Samples

On the sample tab, you find all the tools needed to load, edit and create new samples. Samples, besides synthesizer plugins, are the key sound source in OpenMPT. Depending on the module format used, they are directly used without further modifications (MOD and S3M format) or are references by instruments, where they can be passed through a variety of envelopes and other effects (all other formats).

A number of sample properties can be controlled on this tab, such as default volume and panning, loop and sustain points as well as auto vibrato. All options are explained in detail here.

Sample Tab
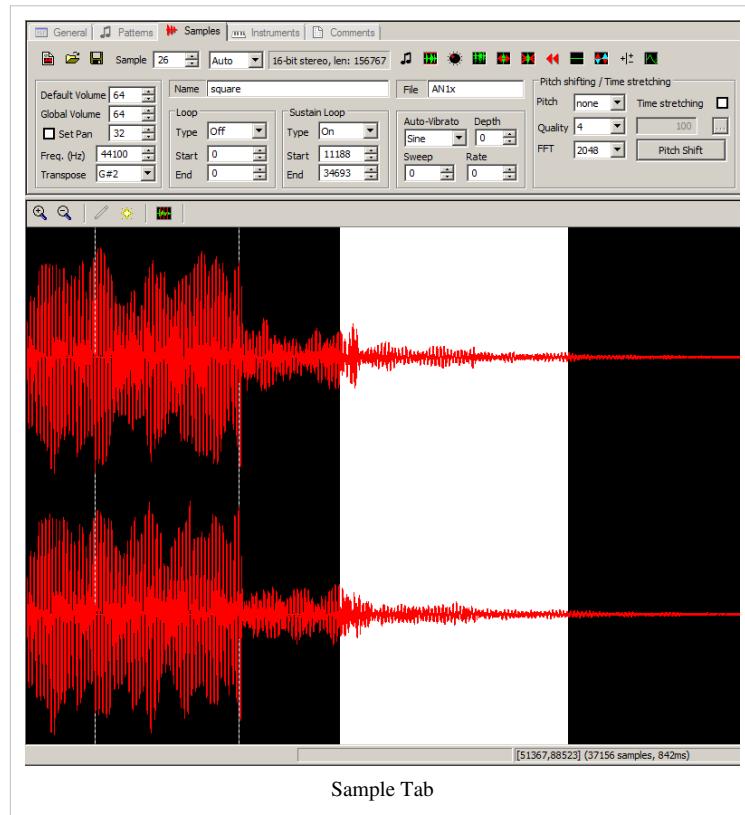
Toolbar

File Toolbar
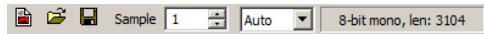
- **New Sample**: Creates a new sample. In instrument mode, you are asked if the new sample should be assigned with a new instrument. Shift-clicking this button duplicates the current sample.
- **Load Sample**: Loads one or more sample in one of the following formats: WAV, AIFF / AIFF-C, XI (Fasttracker 2 instruments), PAT (Gravis UltraSound patches), ITS (Impulse Tracker samples), S3I (Scream Tracker 3 samples), 8SVX (Amiga IFF format), RAW (headerless PCM data).
- **Save Sample**: Saves an instrument either in the WAV or RAW format. Hold Shift while clicking the button to mass-export all samples at once. In the save dialog, you can then use the variables `%sample_number%`, `%sample_filename%` and `%sample_name%`.

Next to the toolbar buttons are a spin button for dialling up a different sample, a drop-down box for changing the zoom level and sample format information.

Edit Toolbar

The sample format block is followed by another toolbar that mostly contains tools for editing samples:

- **Preview Sample**: Plays a C-5 note of the current sample. Clicking the button again stops the sample.
- **Normalize**: Amplifies the sample (or a selection of it) as much as possible without distortion. Samples should be normalized before being converted to 8-Bit for optimal usage of the dynamic range. Shift-clicking this button normalizes all samples independently.
- **Amplify**: Opens the Amplify dialog, where the sample (or a selection of it) can be faded in or out and amplified by an arbitrary amount.
- **Remove DC Offset**: Normalises and shifts the waveform so that is centered around the 0 (DC) line. Any DC bias on samples should be removed for optimal headroom usage. Shift-clicking this button removes DC Offset from all samples.
- **Upsample**: Doubles the sample's playback frequency without altering pitch. 8-Bit samples are automatically converted to 16-Bit. This option can be applied to sample selections as well, but compared to the unselected audio material, the selection's playback frequency is doubled, of course.
- **Downsample**: Halves the sample's playback frequency without altering pitch. The same notes as for upsampling apply.
- **Reverse**: Reverses the sample or parts of it.
- **Silence**: Silences a sample selection.
- **Invert Phase**: Inverts the sample's or sample selection's phase.
- **Sign / Unsign**: Applies a theoretical conversion between signed and unsigned PCM data to the sample or a selection. Usually this would used for fixing imported RAW samples witgh mixed up signed / unsigned import options, but it can also produce nifty-sounding distorted samples.
- **Crossfade**: Applies a crossfade between the sample loop start and loop end for seamless sample loops.
- **Tune sample**: Opens the Sample Tuner dialog, where a sample can be tuned to a given note.

Volume, Panning and Pitch

- **Default Volume**: The note velocity that is applied if no volume command is found next to a note. It can be overriden by placing a volume command (vxx in the volume column, or Cxx in the effect column in the MOD format) next to the note. Enabling **Show default volume commands** in the General settings displays the default volume next to a note.
- **Global Volume**: The overall attenuation of the sample. At a global volume of 64, no attenuation is done, at 32 the sample is half as loud, etc.
- **Set Pan**: Sets the default panning of the sample, which can be overridden by pattern panning commands. If enabled, sample panning overrides the default channel panning and instrument panning. In the XM format, every sample is forced to have a default panning, so there is no channel panning or instrument panning.

In the S3M, IT and MPTM format, you can directly define the playback frequency of the Middle-C:

- **Frequency**: Defines the playback frequency of C-5.
- **Transpose**: Shows to which note the C-5 frequency is relative to. It can be used to quickly tune the sample to a different note. When changing the transpose value, the frequency is updated instantly.

In the MOD and XM format, you get different options:

- **Finetune**: Specifies a slight variation (up to a few hundred Hz) from the **Transpose** note.
- **Transpose**: Shows to which note the C-5 frequency is relative to. In the MOD format, this value is locked to C-5, i.e. the Middle-C frequency cannot be changed coarsely, only fine-tuning is possible. Lower notes in this drop-down box represent a higher Middle-C frequency.

Sample Loops

Depending on the module format used, samples can have "normal" and sustain loops. Every loop as a **Start** and **End** point, and there are several loop points avaiable:

- **Off**: The loop is not activated.
- **On**: The loop is repeated from the start to the end.
- **Bidi**: The loop is played bi-directionally, i.e. it is first played from start to end, then reversed from end to start.

Sustain loops are played as long as no Note Off event is encountered. They are always considered before normal loops, so if the sustain loop is placed beyond the normal loop, the normal loop is ignored at first. As soon as the sustain loop is exited (by means of a Note Off event), playback is resumed in the normal loop.

Auto Vibrato

OpenMPT's sample player has an internal oscillator which can be applied to pitch, creating an automatic vibrato effect. Depending on the format, each sample (IT / MPTM) or instrument (XM) can have its own Auto Vibrato settings. In the XM format, all samples that are assigned to the same instrument will share the same vibrato settings.

Auto Vibrato can be combined with vibrato effects in the pattern editor — they both function independently. The Auto Vibrato settings cannot be changed in the patterns, though, so the only way to change the Auto Vibrato amount for a sample is to duplicate it.

The Auto Vibrato is defined by the four following attributes:

- **Vibrato Waveform**: In this field, you can select the oscillator waveform, i.e. the waveform that is used to modulate the sample pitch.
- **Vibrato Depth**: Defines how "deep" the vibrato is. The higher the value is, the more the sample pitch is changed.
- **Vibrato Sweep**: Defines how fast the vibrato reaches the full oscillation depth. The behaviour of this setting is inverse in the XM and IT track formats:
  - IT: The higher the value, the quicker the vibrato fades in. 0 means no vibrato at all, 255 means that the full depth is instantly used (no sweep is applied).
  - XM: The higher the value, the slower the vibrato fades in. 0 means no sweep, 255 is a very slow fade-in.
- **Vibrato Rate**: The rate (or speed) at which the vibrato will be played. A higher value implies a faster vibrato effect.

Pitch Shifting and Time Stretching

Pitch Shifting and Time Stretching can be used to alter a sample's pitch without affecting playback speed and to to change a sample's length without altering its pitch. By default, OpenMPT is in Pitch Shifting mode.

Pitch Shifting

Pitch shifting is done using Short-time Fourier Transform [1] (STFT). Three parameters are available for configuration:

- **Pitch**: The amount of semitones the sample should be shifted upwards or downwards.
- **Quality**: The oversampling factor which also determines the overlap between adjacent STFT windows. Higher values usually provide better results.
- **FFT Size**: The size of one FFT frame used for processing. Depending on the frequency content of the sample, higher or lower values may sound better.

Time Stretching

By clicking the **Time Stretching** checkbox, the Time Stretching mode is enabled. The follwing parameters are available:

- **Parameters**: A string which contains a SoundTouch configuration. The numbers are, from left to right:
  - **Default sequence length**: This is the default length of a single processing sequence in milliseconds which determines the how the original sound is chopped in the time-stretch algorithm. Larger values mean fewer sequences are used in processing. In principle a larger value sounds better when slowing down the tempo, but worse when increasing the tempo and vice versa.
    A value of 0 (default) lets the algorithm choose this parameter automatically.
  - **Default seeking window length**: The seeking window default length in milliseconds is for the algorithm that seeks the best possible overlapping location. This determines from how wide a sample "window" the algorithm can use to find an optimal mixing location when the sound sequences are to be linked back together.
    The bigger this window setting is, the higher the possibility to find a better mixing position becomes, but at the same time large values may cause a "drifting" sound artifact because neighboring sequences can be chosen at more uneven intervals. If there's a disturbing artifact that sounds as if a constant frequency was drifting around, try reducing this setting.
    A value of 0 (default) lets the algorithm choose this parameter automatically.
  - **Overlap length**: Overlap length in milliseconds. When the sound sequences are mixed back together to form again a continuous sound stream, this parameter defines how much the ends of the consecutive sequences will overlap with each other.
  - **Step length**: Defines how many sampling points are stretched at a time (buffer length).
- **Ratio**: Defines how much the sample is stretched, ranging from 50% (double speed) to 200% (half speed).
- **Time Stretch Calculator**: By clicking the button next to the stretch ratio, the Time Stretch Calculator dialog is opened, where you can calculate the correct time stretch ratio for a given tempo and pattern setup.

Sample Display

Sample Display Toolbar

- **Zoom In / Zoom Out**: Increases or decreases sample zoom. You can also press Ctrl while scrolling the Mouse Wheel to achieve the same effect.
- **Toggle Draw Mode**: Enables or disables sample drawing which can be used to fix small mistakes in the sample waveform or to create chip samples. Hold down shift while drawing to draw horizontal lines.
- **Resize Sample**: Changes the length of the sample by either adding silence at the start or end or by resizing it to a given length. This can also be used to create new samples for chip samples if there is no sample yet.
- **Sample Grid Size**: Enables an invisible sample grid which restricts sample selections to equal-sized sample portions. Set the sample grid size to 0 to disable the sample grid again.

Below the toolbar, the actual sample is displayed. By dragging the mouse, sample selection can be made. Shift-clicking a point can be used to draw a sample selection from a previously clicked point to that point. Ctrl-clicking a point plays the sample from that position at the Middle-C frequency.

In the status bar, some information about the sampling point below the mouse cursor and (if existing) the current sample selection:

- If no selection is made, the focussed sampling point is displayed and it position is translated into an Offset pattern effect.

- If a selection is made, the selection's start and end point and the selection length (both in samples and in seconds, based on the Middle-C frequency) are displayed in addition to the focussed sampling point's position.

Right-clicking the sample waveform opens the context menu.

Sample Display Context Menu

The context menus for the sample display are different depending on whether or not there is a selected block of data.

- **Set as Loop**: When a selection is made, this sets the start and end points of the Sample Loop to that of the selection block.
- **Set Loop Start**: Uses the selected sample point as the start of the Sample Loop.
- **Set Loop End**: Uses the selected sample point as the end of the Sample Loop.
- **Set as Sustain Loop**: When a selection is made, this sets the start and end points of the Sustain Loop to that of the selection block.
- **Set Sustain Start**: Uses the selected point as the start of the Sustain Loop.
- **Set Sustain End**: Uses the selected sample point as the end of the Sustain Loop.
- **Convert to 8-Bit**: The sample's bit depth is reduced to 8-Bit, reducing its sound quality in exchange for a smaller sample size.
- **Convert to Mono**: Mixes the left and right channels of a stereo sample together, which halves the required file space.
- **Trim**: Deletes all sample data outside of the selected region.
- **Trim around Loop Points**: Deletes all sample data outside of the sample loop. This is only available if no selection has been made.
- **Quick Fade**: If the selection includes the beginning of the waveform, this applies a fade-in from the first sample point to the last one in the selected region. If the selected region includes the end of the waveform, then a fade-out from the first sample point of the selection to the last one is applied.
- **Cut**: Performs a Copy command, then removes the selected sample data.
- **Copy**: Copies the selected part of the sample (or the whole sample if there is selection) to the clipboard. You can then paste this sample data somewhere else. Some third-party applications can make use of this clipboard data.
- **Paste**: Replaces the entire sample with the sample data in the clipboard. You cannot paste **into** the sample waveform.
- **Undo**: Reverts to the previous waveform data (before the last edit).
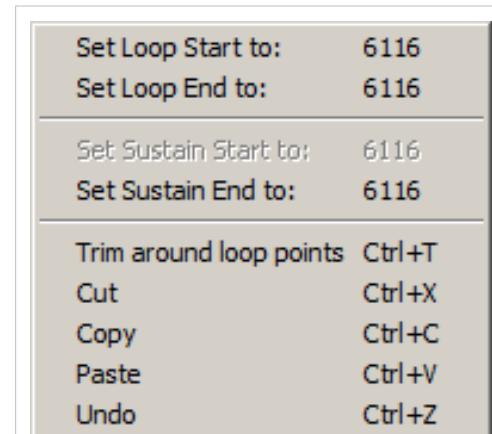
Default sample context menu
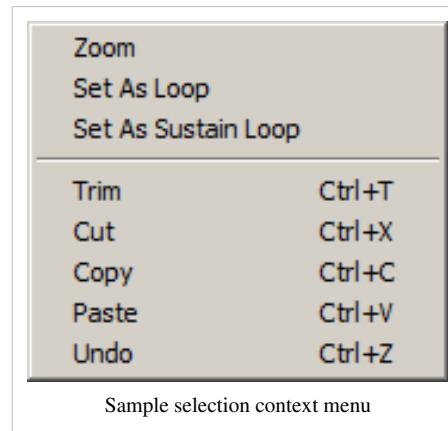
Sample selection context menu

References

[1] http://en.wikipedia.org/wiki/Short-time_Fourier_transform

Instruments

Instruments are an additional "layer" above samples that is available in some module formats supported by OpenMPT. An instrument can hold one or several samples that are assigned to different keys. This is also called **multisampling**. It can be used to create easy-to-use realistic sounding instruments (for example, you can assign a different piano sample to every note for a rather realistic reproduction of a piano) or drum sets (like the General MIDI drum set, where every note represents a different percussion instrument). Instruments also hold volume, panning and pitch / filter envelopes which can be used to further modify the sound of those samples.

Instruments can also be used to control instrument plugins. You can assign a combination of MIDI channel and MIDI

Instrument Tab

programs of an instrument plugin to a module instrument for easy usage.

By default, IT and MPTM files are created in "sample mode", which means that instrument properties cannot be accessed. If you wish to use "instrument mode" instead, simply click the **New Instrument** button in the toolbar to convert all samples to instruments. After doing so, every sample is represented by an instrument.

In instrument mode, lone samples that are not assigned to an instrument cannot be accessed in a pattern; to be able to access them, they have to be assigned to an instrument using the Sample Map.
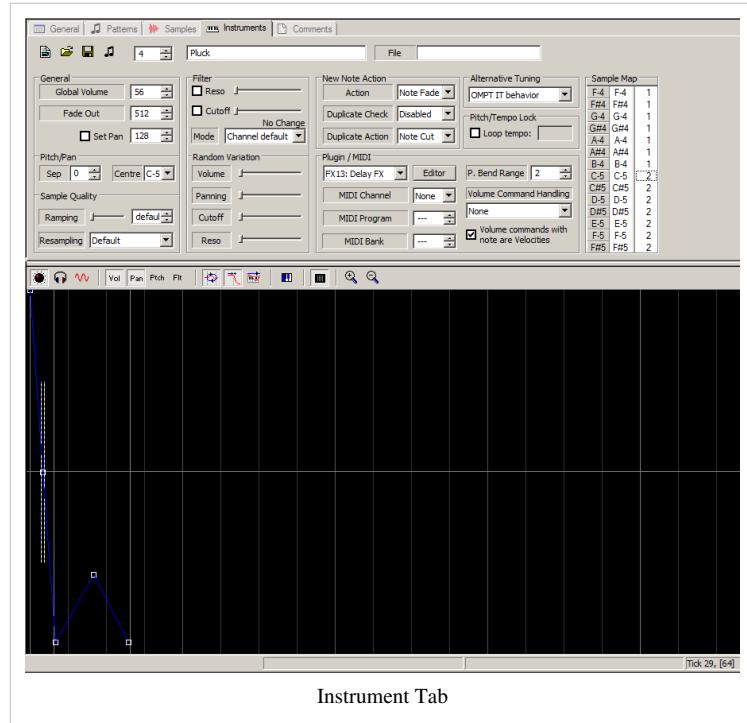
Toolbar

- **New Instrument**: Creates a new instrument and associates it with a free sample slot. Shift-clicking this button duplicates the current instrument.
- **Load Instrument**: Loads one or more instruments in one of the following formats: ITI (Impulse Tracker instruments), XI (Fasttracker 2 instruments), PAT (Gravis UltraSound patches), WAV, AIFF. You can load multiple instruments at the same time, which are then loaded into multiple instrument slots.
- **Save Instrument**: Saves an instrument in the ITI or XI format.
- **Preview Instrument**: Plays a C-5 note of the current instrument. Clicking the button again fades out the playing note and releases all sustain loops.

Next to the toolbar buttons are a spin button for dialling up a different instrument, the internal instrument name and the internal instrument file name.

Volume and Panning

- **Global Volume**: The overall attenuation of all samples assigned to this instrument. At a global volume of 64, no attenuation is done, at 32 the samples are half as loud, etc.
- **Fade Out**: Determines how fast samples will fade out if the end of the volume is reached, a note fade command is triggered in the pattern or the New Note Action "Note Fade" is used. The higher the value, the faster the samples are faded out.
- **Pan**: The default pan position of this instrument. This setting overrides channel panning, but can be overridden by panning commands and sample panning.

Pitch / Pan Separation

Using Pitch / Pan Separation, you can spread out samples in the stereo space, depending on the note that is played.

- **Separation**: Determines how much the distance of a note from the Pitch / Pan Centre affects the panning. The higher the value, the more the notes are spread out in the stereo spectrum. A negative value can be used to invert the effect, i.e. higher notes will be placed more on the left rather than the right.
- **Centre**: Defines the note at which the panning is not modified. Notes higher than the centre note will be panned to the right (left with negative separation amount) and notes lower than the centre note will be panned to the left (right with negative separation amount).

Sample Quality

These settings are exclusive to OpenMPT. Other players will not interpret them.

- **Ramping**: Specifies the amount of Ramp-In that is done at the start of the instrument samples in milliseconds. A higher value will reduce the sharpness of the samples' attack. If **default** is chosen, the Ramp-In amount from the Player Setup is used.
- **Resampling**: Defines the resampling algorithm used for playing the instrument samples. The algorithms are identical to those found in the Player Setup, but the exact configuration of the XMMS-ModPlug resampling algorithm cannot be changed in the instrument settings, i.e. the WFIR type and cutoff factor are inherited from the player configuration.

Filter

These settings can be used to setup the resonant filter that can be applied to samples (but not plugins).

- **Resonance**: Sets the resonance amount of the filter (sometimes called the "Q factor"). The higher the resonance, the more the cutoff frequency is "stressed".
- **Cutoff Frequency**: Defines the frequency at which the filter starts to damp frequencies. If a lowpass filter is used, that means that frequencies above this point are damped, with a highpass filter the frequencies below are reduced.
- **Filter Mode**: Sets the type of filter to be used with this instrument. If **Channel Default** is used, the previous filter setting of the pattern channel the instrument is used on is re-used. By default, all channels are set to use the lowpass filter, but the filter type can be changed by MIDI Macros or preceding instruments on the same channel. This setting is exclusive to OpenMPT.

Random Variation

Random Variation can be used to add a bit of randomness (or "humanisation") to the instrument playback.

- **Volume Swing**: A random percentage is subtracted from or added to the sample's global volume. The slider can be used to adjust the maximum percentage.
- **Pan Swing**: The sample is panned to the left or right by a random amount.
- **Cutoff Swing**: The resonant filter's cutoff frequency is changed by a random amount. This setting is exclusive to OpenMPT.
- **Resonance Swing**: The resonant filter's resonance amount is changed by a random amount. This setting is exclusive to OpenMPT.

New Note Action

By default, only one note can be played on a channel at a time. Using **New Note Actions** (or NNAs for short), it is possible to move playing notes to background channels instead when triggering a new note, so that they can be faded out or continue to run indefinitely. New Note Actions are a great way to save pattern channels that would otherwise be used just fading out playing notes. Furthermore, **Duplicate Note Actions** (or DNAs for short) can be used to handle playing notes of the same instrument, sample or plugin separately.

- **New Note Action**: Determines what is done with the playing note:
  - **Note Cut**: The old note is instantly cut off and replaced by the new note (default behaviour).
  - **Continue**: The old note is moved to a background channel. This is mostly useful with short one-shot samples such as percussion instruments. Pay attention when using this option together with looped samples: They will loop indefinitely until you trigger one of the "Past Note" effects (S70, S71 or S72).
  - **Note Off**: Sample and envelope sustain loops of the old note are released.
  - **Note Fade**: The old note is faded out. If the **Fade Out** value is 0, this is practically identical to the **Continue** option, so the same precautions apply.
- **Duplicate Note Check**: Defines the type of event for which the **Duplicate Note Action** is applied:
  - **Disabled**: By default, the Duplicate Note Action is not executed.
  - **Note**: If the previously playing note on that channel is the same as the newly triggered note, the Duplicate Note Action is executed.
  - **Sample**: If the previously playing sample on that channel is the same as the newly triggered sample, the Duplicate Note Action is executed.
  - **Instrument**: If the previously playing instrument on that channel is the same as the newly triggered instrument, the Duplicate Note Action is executed.
  - **Plugin**: If the newly triggered note is played by the same instrument plugin as the previously playing note, the Duplicate Note Action is executed.
- **Duplicate Note Action**: If the Duplicate Note Check condition is fulfilled, one of the Duplicate Note Actions is executed. They are identical to the **New Note Actions**.

Plugin / MIDI

In the plugin section, you can assign an effect or instrument plugin to the instrument. Effect plugins can be used to modify the sound of the instrument's samples, instrument plugins on the other hand are a sound generator by themselves, i.e. you do not need to assign samples to an instrument that is already assigned to an instrument plugin.

- **Plugin**: In this dropdown list, you can select to which plugin the sample audio is routed or which instrument plugin is triggered. Use the **Editor** button to view the plugin's editor.
- **MIDI Channel**: Configures the MIDI channel on which notes triggered in the pattern are sent to the assigned plugin. This is **essential** for instrument plugins — if you do not specify a MIDI channel, you will not hear any sound coming out of your plugin. You can either set the MIDI channel to one of the 16 standard MIDI channels, or choose **Mapped** to choose a MIDI channel based on the pattern channel in which the note is triggered. In that case, the MIDI channel is the pattern channel modulo 16, so if a note is triggered on pattern channel 1 (2, 3, 4,… 16), it will be sent to the instrument plugin on MIDI channel 1 (2, 3, 4,… 16); If a note is triggered on pattern channel 17, it will be sent to the instrument plugin MIDI channel 1 again.
- **MIDI Program**: Here you can specify a MIDI program that should be sent to instrument plugins. This is especially useful when working with multitimbral plugins, so you can have different sounds on different (or even the same) MIDI channels. By default, no MIDI program change is sent to the plugin.
- **MIDI Bank**: Same as above, but specifies the MIDI bank of the MIDI program. By default, no MIDI bank change is sent to the plugin.

For instrument plugins, further options are available:

- **Pitch Bend Range**: For portamento and vibrato commands to work with instrument plugins, OpenMPT must know the Pitch Wheel Depth for which the plugin has been configured on the selected MIDI channel. Since there is no standardized way to configure the bend range of a plugin or external MIDI gear, you have to tell OpenMPT to which bend range the plugin is configured. If you set up this value correctly, portamento and vibrato commands sent to plugins should sound identical to their sample counterparts.
  - Please note that not all plugins offer the same pitch bend granularity and may still produce pitch bends that differ slightly from sample portamento. This cannot be fixed by OpenMPT, but it should only be audible when trying to slide exactly to a specific note.
  - Negative range values may also be entered to compensate for a negative Pitch Wheel Depth (so that Portamento Up commands will still slide upwards).
- **Volume Command Handling**: Determines how volume commands without notes (or all volume commands, if the checkbox below is not ticked) are handled:
  - **None**: Volume commands are not sent to plugins.
  - **MIDI Volume**: Volume commands are sent as MIDI Volume (MIDI CC #7) commands. This affects all playing notes on the same plugin MIDI channel. Not all plugins handle MIDI Volume.
  - **Dry/Wet Ratio**: Volume commands alter the plugin's Dry/Wet ratio. This affects all playing notes of the plugin.
- **Volume commands with notes are Velocities**: Determines how volume commands next to notes (velocity) are handled; If the checkbox is ticked, such volume commands are only treated as MIDI Note-On velocity (default behaviour). If it is not ticked, volume commands next to notes are handled just like other volume commands (see previous option). In this case, the instrument's **Global Volume** is used as the MIDI Note-On velocity instead.

The last two options are always disabled if the Plugin Volume Command Bug emulation setting the Song Properties is enabled.

Tuning

In the MPTM format, you can select a custom tuning for the samples that are assigned to this plugin. Choosing **Control Tunings** from the dropdown list will open the Tuning Properties window.

Pitch / Tempo Lock

With this setting, you can specify at which tempo the sample loops correctly. This can be useful e.g. when using drum loops of which you know the exact beats per minute. If the Pitch / Tempo Lock is enabled, changing the song tempo will automatically slow down or speed up the samples assigned to this instrument.

Sample Map

The Sample Map holds the sample assigments for every note. From left to right you see which note of the instrument (the note is triggered in the pattern) corresponds to which note (the note that is actually heard) of which sample.

The middle column (sample note) is especially useful when creating drum sets, as you will not have to adjust the C-5 frequency of each of the assigned samples then: Simply map all notes to C-5 and you are done. Note that this column is not available in the XM format, where you can only configure the sample assignments.

In the sample column, you can type in any sample number to reference an existing sample. You can also type in "0" to not reference any sample. This should for example be done if the instrument is already assigned to an instrument plugin. You should also keep in mind that only 16 samples can be referenced by each instrument in the XM format.

Context Menu

- **Edit Sample Map**: Opens the Sample Map dialog, where you can assign samples to certain notes for input and playback.
- **Edit Sample**: Allows you to select one of the associated samples in order to modify it in the Sample Editor.
- **Map all notes to sample**: Assigns all notes to the sample in the current slot.
- **Map all notes to note**: Assigns all notes to the current note.
- **Transpose map up**: Moves the note assignments up one semitone.
- **Transpose map down**: Moves the note assignments down one semitone.
- **Reset note mapping**: Reverts the map to the default assignment of C-0 through B-9.
- **Duplicate instrument**: Creates a new instrument slot and sets all of its attributes to those of the current instrument.

Envelope Editor

Envelopes can be used to alter the playback characteristics of samples: Using the **Volume Envelope**, you can adjust the loudness of the samples, the **Panning Envelope** moves them around in the panning space and using the **Pitch / Filter Envelope**, you can either adjust the pitch of the playing note or the resonant filter's cutoff frequency.
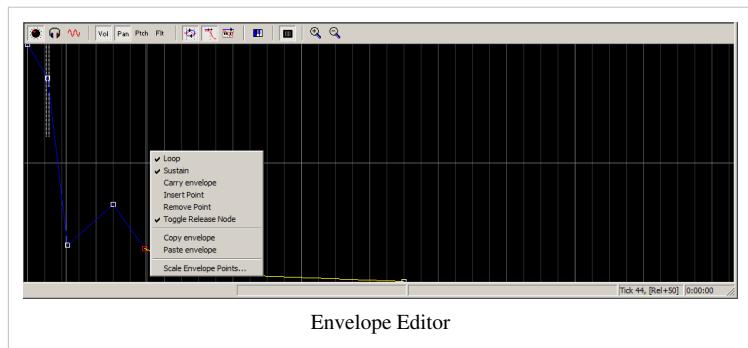
Envelope Editor

Envelope Editor Toolbar

The first three buttons are used to switch between the envelopes: You can view the **Volume Envelope**, the **Panning Envelope** and the **Pitch/ Filter Envelope**.

The next four buttons are used to toggle these envelopes. The third and fourth button are mutually exclusive, though:

- The third button is used to enable or disable the pitch / filter envelope and explicitely configures it to act as a pitch envelope.
- The fourth button is used to enable or disable the pitch / filter envelope and explicitely configures it to act as a filter envelope.

In the MPTM format, you can turn the pitch envelope into a filter envelope and vice versa using pattern effects.

The next three are used for configuring the currently displayed envelope:

- **Envelope Loop**: Enables the envelope loop. Envelope loops cannot be stopped by Note Off events.
- **Envelope Sustain**: Enables the envelope sustain loop (or sustain point in the XM format). Sustain loops are exited as soon as a Note Off event occours.
- **Envelope Carry**: When triggering a new note, the envelope is not re-played from the beginning, but rather "carried on".

In the XM format, it does not matter if the envelope loop is reached before the sustain point or vice versa: Whichever of the two is reached first is used for looping the envelope.

When using IT compatible playback, though, the sustain loop is always considered before the envelope loop, so if the sustain loop is placed beyond the envelope loop, the envelope loop is ignored at first. As soon as the sustain loop is exited (by means of a Note Off event), playback is resumed in the envelope loop.

All further buttons are used various tasks:

- **Show Sample Map**: Opens the Sample Map dialog.
- **Show / Hide Row Guidelines**: Toggles guidelines displayed at every beat (dark grey) and every measure (light grey).
- **Zoom In / Zoom Out**: Increases or decreases envelope zoom. You can also press Ctrl while scrolling the Mouse Wheel to achieve the same effect.

Envelope Display

Below the toolbar, the actual envelopes are displayed. New envelope nodes can be inserted by Shift-clicking somewhere in the editor. Middle-click an envelope nodes to remove it again. Envelope nodes and loop points can be moved around by simply dragging them with the left mouse button pressed, or by setting up appropriate keyboard shortcuts. Press Ctrl while dragging an envelope node to also move all trailing envelope nodes.

In the status bar, the mouse cursor position is translated into its corresponding envelope tick and value if the mouse hovers the envelope display. If the mouse points beyond the release node, the envelope value is displayed relatively to the release node's value.

Envelope Editor Context Menu

- **Loop**: Toggles the Envelope Loop.
- **Sustain**: Toggles the Envelope Sustain Loop.
- **Carry**: Toggles the Envelope Carry.
- **Insert Point**: Adds a new point to the envelope at the location of the mouse click.
- **Remove Point**: Removes the selected point from the envelope. You cannot remove the first point.
- **Toggle Release Node**: Toggles the selected point as a Release Node. Envelope playback is resumed from that node if a Note Off event is encountered. In that case, the volume of all following nodes is relative to the volume of the envelope point that was reached at the Note Off event.
- **Copy Envelope**: Places the data of the envelope into the Clipboard.
- **Paste Envelope**: Transfers the envelope data in the clipboard to the selected envelope, replacing it if it exists already.
- **Scale Points**: Shows the Scale Envelope Points dialog which allows you to stretch or contract the envelope by a given factor and to amplify the envelope.

Comments

The Comments contains a song commen text (not available in all module formats) and sample / instrument information. In the text box at the top, you can put in comments or notes for the module. The font size of this text box can be toggled in the General page of the Options dialog.

The bottom half of the page lists the samples or instruments (depending on the icon chosen) that are used in this track, sorted according to their slot ID. In the sample view, the samples are shown with their waveform lengths, bit depth, the frequency at middle C, the instrument(s) the sample is assigned to, and the text listed in the File Name field on the Samples page. In the instrument view, the sample IDs and envelopes are listed that each instrument uses, the File Name text is shown, and plugins are listed if the instrument is assigned to a plugin. If the track is an ITP module, the path of the instrument is also given.

Comments Tab

You can customize the view in a few ways. First of all, you can resize the column widths by sliding the column separators in the header. Double-clicking on the separator will resize the column to fit all of the text of the entries. You can edit the Name fields by slowly clicking twice on the sample's/instrument's label, while double-clicking will open the sample/instrument to that slot on their respective pages.

Display Features

Multiview

While you can not move the tabs to their own position, you can get a more complete look at your track with Multiview, as shown in the graphic below.

In the next graphic, we are looking at the same track under three different tabs at the same time.
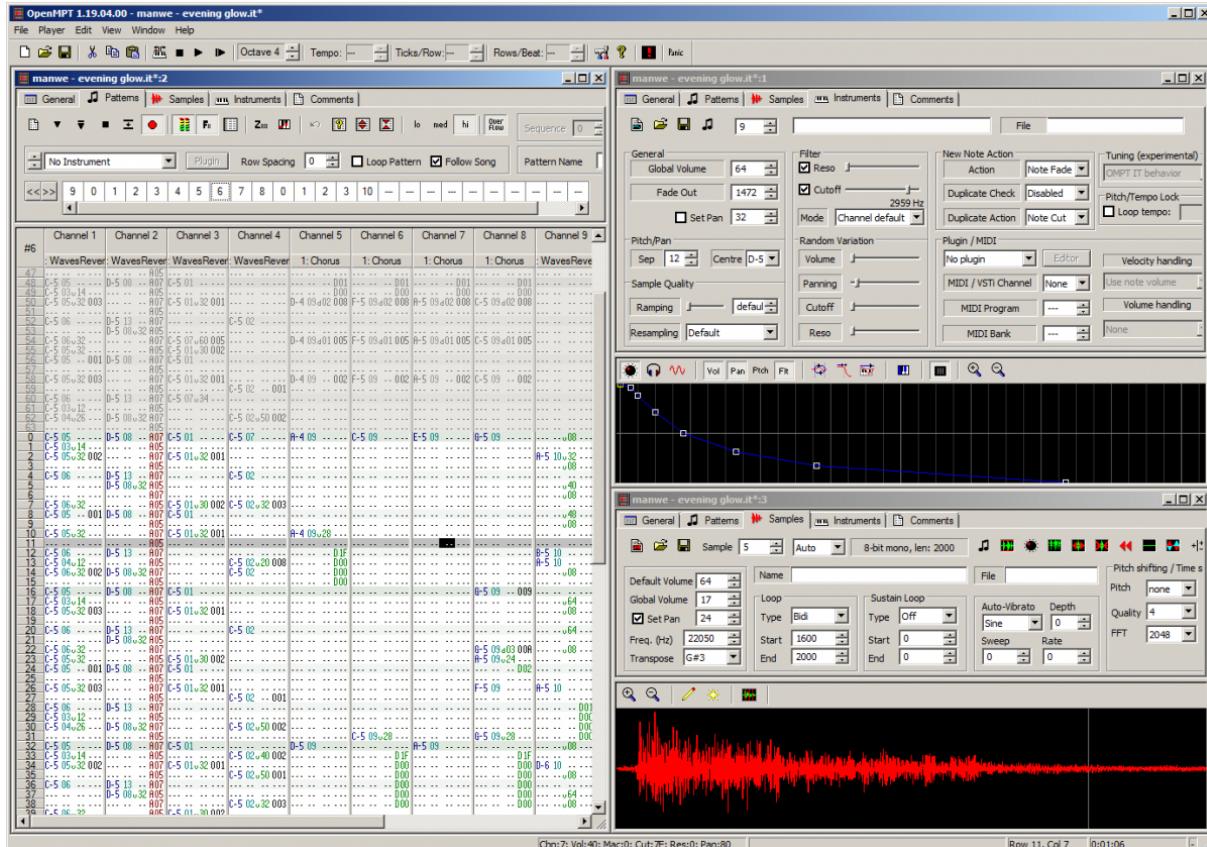
To view more than one tab at once, open a song and select "New Window" from the Window menu. This opens an auxiliary window of the current track, which you can reposition and resize inside ModPlug's window. From here you can choose one tab, such as the General page, in one window, and the Pattern page in the other window. You can even open a window for each tab using the same method. To autoposition the windows, you can choose one of the functions in the Window menu — Cascade, Tile Horizontally, or Tile Vertically.

Unfortunately there are two important limitations. First, the windows do not update automatically in the Pattern, Sample, and Instrument pages, so that changes that you make in one window of Multiview will not show up immediately in the other window (if it is open in Patterns, Samples, or Instruments). Second, the window positions are not saved with the song, no matter what format the track is in.

Other Windows

Song Properties

The attributes found in this page are very fundamental to the track, and none of them can be changed during playback using effect commands. On the contrary, some of these settings even affect how certain effect commands work. The track type you use dictates which properties can be enabled. For new tracks, you can set anything available, but when you load a module, you almost never want to change these attributes unless you are trying to update the module or make it available in another format.

Track Type

Shows the current track format. Clicking on this field will open a popup menu where you can choose to convert the track to another format. However, in doing so, you may lose features if you convert "down."

Channels

Shows the number of channels that are assigned to this track. Clicking on the field will open a popup menu where you can choose the number of channels. Keep in mind that each track type has a minimum and maximum number of channels, but it depends on the Compatibility Mode.

Song Properties window

Embed Instrument Parameters

This option is only for IT Project files. When checked, this allows edits you make to the track's instruments (which, remember, are external) to be saved with the ITP file, without affecting the instrument file. If you leave this setting **unchecked**, edits to instrument settings will not be saved with the ITP file (only the actual samples are), and when you re-open the file, the settings from the original .iti file will be used and you lose changes you made to the instrument. If you want to save instrument edits **without** embedding the settings, you may edit the instrument in the track but you must save it before closing the IT Project. The disadvantage to **this** is that any other ITP tracks that use that instrument — and do not embed instrument parameters — will be using a different instrument than what it was composed with, which will probably mean a drastic change in the audio output.
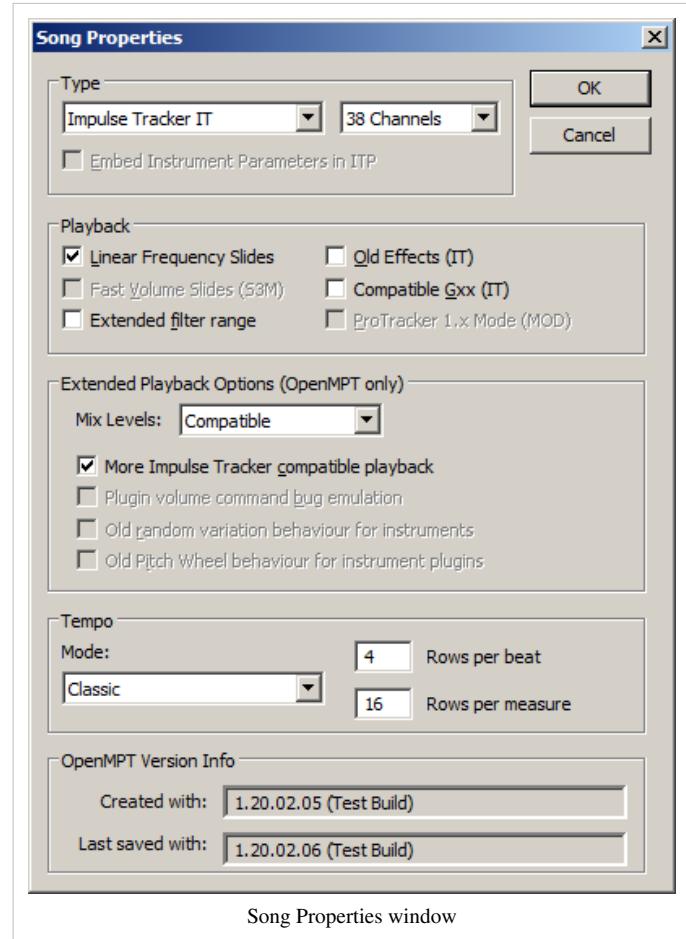
Playback Flags

Linear Frequency Slides

On older trackers, frequency slides always slided the same amount of "periods" (an unit that is inverse to frequency). As the note scale is logarithmic, this means in practice that sliding by a given amount of periods becomes less "effective" in the lowest octave (i.e. it will not change the note as much) than in the higher octaves. Linear slides avoid this problem - Slide parameters are defined by $\frac{1}{64}$th note units, so the same slide parameter will always slide the same amount of Notes instead of the same amount of frequency. It is recommended to leave this setting enabled for new songs, changing it for existing songs can destroy note slides in those songs. Note that the MOD and S3M format never make use of linear slides.

Fast Volume Slides

Applicable only when loading S3M tracks, checking this box will apply volume slides on every tick (as opposed to every non-row tick), which was the default behaviour in Scream Tracker 3.0. Normally you should not need to change this setting as it will modify note slide behaviour.

Extended Filter Range

Normally the Cutoff frequency range is from 130 Hz to about 5 KHz. Checking this box allows for the instrument filtering range to be doubled, to a range of 130 Hz to about 10 KHz.

IT Old Effects

When this checkbox is enabled, some effects commands (Vibrato, Tremor, Tremolo, Offset) are played like older versions of Impulse Tracker (and other trackers) would play them. Even if "old" might sound bad, you should not change this setting for existing tracks as some effects might play differently.

Compatible Gxx

Normally Portamento commands in IT tracks (Exx, Fxx, and Gxx) share their memory; that is, the last value used by one of them will be used by another if calling a 00 value. If you check this box, Gxx memory is **not** shared in IT tracks (but you must also set the IT Compatibility flag, described below). This behaviour is more consistent with other trackers like Fasttracker 2, where tone portamento (3xx) and note slides (1xx and 2xx) do not share memory as well. Another notable difference is that any envelopes are reset when using Gxx next to a note + instrument combo (like in the XM format) and that the effect of a previous Key-Off note is nullified when Compatible Gxx is enabled.

ProTracker 1.x mode

For MODs assembled with ProTracker 1, you might need to check this box for proper playback. If you edit a MOD in this mode, notes that fall outside of the standard range (C4 to B6) will be colored red to warn you that these notes cannot be played on a real Amiga, and they will also be corrected to the Amiga's frequency range. Also, in this mode, the panning commands 8xx and E8x are ignored during playback and samples can be changed "on the fly" (without having a note next to the instrument number in the pattern editor) like in IT modules. OpenMPT tries to detect if a MOD makes use of this behaviour and automatically enables this options if it thinks that the module was made with ProTracker 1.

Mix Levels

Mix Levels dictate the volume ratio between samples and VST plugins. Most importantly, the mix levels determine how samples are amplified before they are being sent through a plugin. By default, the best mix levels for the current file are chosen when creating a new songs. Some legacy mix level settings may only be available when opening an existing module which made use of them.

Here is an overview with all the differences. The latest mix level modes are on the right.

	Original (MPT 1.16)	**OpenMPT 1.17RC1**	**OpenMPT 1.17RC2**	**OpenMPT 1.17RC3**	**Compatible**
Soft Panning	User-Defined in Setup	User-Defined in Setup	User-Defined in Setup	Forced On	Forced Off
Sample Pre-Amp	User-Defined in Setup	User-Defined in Setup	User-Defined in Setup	Fixed (No Attenuation)	Fixed (Half Volume)
Global Volume	Applied to Samples	Applied to Samples	Applied to Samples	Applied to Master	Applied to Master
Sample Volume	Halved before being sent to plugins Doubled when sending back	Divided by 16 before being sent to plugins Multiplied by 16 when sending back	Correct levels (no multiplcation)	Correct levels	Correct levels

As the sample volume is reduced before samples are being sent to the plugin in the two oldest mix modes (1.16 and 1.17RC1), plugins do not receive the correct levels of the samples. To compensate for this, the plugin's output is multiplied to normal gain again. As VST instruments have no input, this effectively means that VST instruments are twice as loud as intended when using the oldest mix mode, and sixteen times as loud when using the OpenMPT 1.17RC1 mix mode. Hence, **do not use them**. When working with plugins, use the latest (OpenMPT 1.17RC3) mix mode.

When applying global volume to samples rather than to the master output, the output of VST plugins is not affected by global volume, which is usually not the wanted behaviour.

The **Compatible Mix Level** settings are automatically used when playing MOD and S3M tracks, and should always be used when writing IT and XM tracks. The sample mix levels are identical those of Schism Tracker in this mode, meaning that (almost) identical audio levels can be guaranteed across several trackers.

Miscellaneous Flags

A set of toggles that enable certain compatibility features for the module and is only interpreted by OpenMPT.

More IT-Compatible playback

Only visible in IT and IT-type modules, this is the "Compatible Mode" setting that forces OpenMPT to behave more like Impulse Tracker when playing IT and IT-type files. In the past, various pattern effects and other settings have been interpreted wrong by OpenMPT, leading them to sound different from more standard-compliant trackers and players. See the section on Compatibility to understand the differences. If you do not set this checkbox, the IT track will probably play properly only within ModPlug Tracker or ModPlug Player. Generally, it is advised to enable this option if you are going to spread your module on the internet. Before doing so, you should compare playback with XMPlay or Impulse Tracker to ensure that everything sounds as intended.

More FT2-Compatible playback

Only visible in XM modules, this is a similar setting to "More IT-Compatible playback", with the difference that it plays XM files more like Fasttracker 2 would. See the section on Compatibility to understand the differences. The same notes as for "More IT-Compatible playback" apply here.

Plugin Volume Command Bug emulation

In OpenMPT 1.17.02.49 and older, there was a bug that sent the wrong volume commands to plugins (The controller and parameter values in a MIDI CC were swapped). When opening such tracks, this flag is automatically checked to emulate the old (buggy) behaviour. This setting cannot be enabled by the user, as it is only available for legacy compatibility.

Old Random Variation behavior for Instruments

Visible only in IT-type modules, this flag will be unset for new modules. Tracks composed with OpenMPT 1.17.02.49 or older making use of random variation will have this flag set, meaning it will use the old (buggy) algorithms when applying Random Variation for volume and panning. This legacy setting cannot be enabled by the user. You would only unset this flag if you are updating the track.

Old Pitch Wheel behaviour for instrument plugins

In previous versions of OpenMPT, sending tracker portamento commands to instruments was always a very imprecise task; sample portamento parameters never matched plugin portamento parameters exactly. This behaviour has been refined so that sample and instrument plugin portamento always behave exactly the same (if the Pitch Wheel Depth parameter for the given instrument is set up correctly), however for files made with older versions of OpenMPT, this compatibility switch remains to ensure that they still sound correct.

Tempo Mode

In the Tempo group, the **Mode** drop down box lets you choose the *tempo mode*: Classic, Alternative, or Modern. Each tempo mode has different advantages and is further explained below. Before comparing the tempo modes, it is helpful to understand the following points.

- The exact meaning of the Tempo value depends on the tempo mode, but increasing the Tempo will always result in a faster note playback speed, decreasing the Tempo always produces a slower note playback speed. There are two ways you can change the Tempo.
  - To set the initial Tempo: In the General tab, use the "Initial tempo" slider or box.
  - To change the Tempo in the middle of a song: In the pattern editor, go to the desired pattern and row and insert a "Set Tempo" effect. (For IT: Txx. For XM: Fxx, where xx is 20 to FF.)
- The smallest unit you can use for creating notes is a row. When any other value affects the row duration, notes will play faster or slower.
- The smallest unit the player uses is a tick, a subdivision of a row.
- In OpenMPT, Speed means the same thing as ticks per row. Changing the Speed affects the timbre of the notes and the behavior of many pattern effects. In some tempo modes, changing the Speed also affects the note playback speed. There are two ways you can change the Speed.
  - To set the initial Speed: In the General tab, use the box labeled "Ticks/Row".
  - To change the Speed in the middle of a song: In the pattern editor, go to the desired pattern and row and insert a "Set Speed" effect. (For IT: Axx. For XM: Fxx, where xx is 01 to 1F.)

Overview

In the Classic and Alternative tempo modes, values are built up from ticks to rows to beats. In the Modern tempo mode, values are subdivided from beats to rows to ticks.

When a value affects the rows per minute or the row duration, notes will play faster or slower. In the table below, the bold and highlighted items emphasize this.

Tempo mode	Classic	Alternative	Modern
Main advantage	Compatible with other players	Before Modern tempo mode was available, let you increase Speed or Rows per Beat further	Easy to understand tempo value
Tempo unit	24 ticks per minute	60 ticks per minute (ticks per second)	beats per minute
Ticks per minute	Tempo × 24	Tempo × 60	Tempo × Rows per Beat × Speed
Rows per minute	**Tempo** × 24 / **Speed**	**Tempo** × 60 / **Speed**	**Tempo × Rows per Beat**
Beats per minute	Tempo × 24 / Speed / Rows per Beat	Tempo × 60 / Speed / Rows per Beat	Tempo
Tick duration	2.5 seconds / Tempo	1 second / Tempo	60 seconds / Tempo / Rows per Beat / Speed
Row duration	(2.5 seconds / **Tempo**) × **Speed**	(1 second / **Tempo**) × **Speed**	60 seconds / **Tempo / Rows per Beat**
Beat duration	(2.5 seconds / Tempo) × Speed × Rows per Beat	(1 second / Tempo) × Speed × Rows per Beat	60 seconds / Tempo
If you decrease or increase Tempo...	notes play slower or faster	notes play slower or faster	notes play slower or faster
If you decrease or increase Speed...	notes play faster or slower	notes play faster or slower	note play speed doesn't change
If you decrease or increase Rows per Beat...	note play speed doesn't change	note play speed doesn't change	notes play slower or faster

Classic Tempo Mode

This mode uses the classic definition of speed and tempo that is compatible with many other trackers. It is always used in legacy formats (MOD, S3M, XM, IT).

For performance reasons, most older trackers were implemented with very little to no floating point arithmetic. Some rounding errors when calculating the number of samples that should constitute a buffer of a given duration mean that tempos could be inexact. In OpenMPT, the Classic tempo mode preserves this "old-school" behaviour.

Alternative Tempo Mode

This was thought as a slightly more complex tempo mode devised by Ericus for the mathematically minded. Most likely due to some typos in the code, this tempo mode is actually not much different from classic tempo mode at all, but it allows for finer tuning than classic tempo mode.

Modern Tempo Mode

This tempo mode compensates for the rounding errors described above, so the real BPM should nearly always correspond to the exact value you specify. This is the most intuitive mode for new users and closest to other modern music software packages. It is recommended to use this mode in MPTM tracks.

A current limitation is that it's impossible to set fractional BPMs with this mode (e.g. 136.46 BPM).

To make use of temporarily increased (or decreased) tracking precision (while staying at the same tempo) in this tempo mode, you will have to change the Rows per Beat of a specific pattern, so this is only possible in the MPTM format.

Time Signature

In the Tempo group, the **Rows per beat** and **Rows per measure** values are used to highlight appropriate rows in the pattern editor and to calculate the time signature that is sent to some plugins. In MPTM modules, patterns can also have a custom time signature which overrides this global time signature. It can be changed in the Pattern Properties dialog.

Version Info

Shows the version of ModPlug Tracker that the current track was created in and last saved with.

Macro Configuration

The Zxx Macro Configuration dialog is used to set up Zxx Macros.

Macro Syntax

Macros are parametered MIDI messages. They may contain uppercase **constants** and lowercase **variables:**

Constants

- The letters **A** through **F** and digits **0** through **9** are constants. They are transferred as 4-Bit values (also called a nibble).

General Variables

- The letter **n** is substituted by the last triggered note on the same channel as the macro is called.
- The letter **c** is substituted by the 4-Bit wide MIDI channel number that can be found in the instrument settings.
- Parametered macros (Z00 through Z7F) may also contain the letter **z**, which is subsituted by the 7-Bit wide Zxx parameter (00h through 7Fh).

Zxx Macro Configuration Dialog

Volume / Velocity Variables

- The letter **v** is substituted by the current note velocity, including volume slides and such.
- The letter **u** is substituted by the current computed velocity, which also includes the volume envelope.

Panning Variables

- The letter **x** is substituted by the current note panning.
- The letter **y** is substituted by the current computed panning, which also includes the panning envelope.

MIDI Program Change Variables

- The letter **a** is substituted by the high byte of the MIDI bank number that can be found in the instrument settings.
- The letter **b** is substituted by the low byte of the MIDI bank number that can be found in the instrument settings.
- The letter **p** is substituted by the MIDI program number that can be found in the instrument settings.

The **Macro Help** button shows a quick reference which explains all possible characters.

"Internal" macro messages start with the character combination F0F0 or F0F1 (which is in fact an invalid SysEx message) and are always four bytes (or eight nibbles) long. They are used to control the resonant sample filters and plugin settings. All other MIDI messages are "external" and are directly sent to plugins.

A macro may consist of several internal and external messages and may be up to 31 characters long, so it is for example possible to control filter cutoff and resonance at once in a single macro.
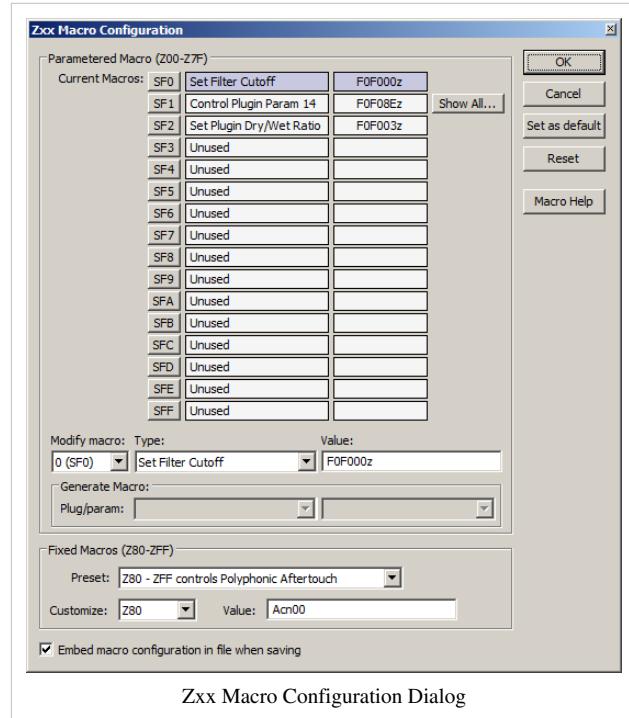
Parametered Macros

Current Macros: A list of the 16 parametered macros. Click on the **SF1** through **SFF** buttons to change the settings for one of them, or select a macro from the **Modify macro** dropdown list. A **Show All** button is shown next to all macros that control plugin parameters. Clicking this button shows a list of plugins which can be controlled by this macro.

You may choose a pre-configured macro type from the **Type** dropdown list:

- **Unused**: This macro does nothing.
- **Set Filter Cutoff**: Sets the cutoff frequency of the resonant filter. Z00 represents the lowest cutoff frequency, Z7F the highest.
- **Set Filter Resonance**: Sets the resonance amount of the resonant filter. Z00 means no resonance, Z7F full resonance.
- **Set Filter Mode**: Z00 activates the lowpass filter, Z10 activates the highpass filter.
- **Plugin Dry/Wet Ratio**: Controls the Dry/Wet Ratio of the currently active plugin on the channel the Zxx command occours in. Z00 means 0% Wet / 100% Dry, Z7F 100% Wet / 0% Dry. Note that channel plugins are prioritised over instrument plugins if both are preset on a channel (this is also true for the following presets).
- **Control Plugin Param**: For plugin parameter control, you must also specify a parameter that shall be controlled. For this, choose a plugin from the dropdown list below and a parameter from the dropdown list next to that. Note that macros are not bound to a single plugin; they are applied to whatever plugin is active on the channel the Zxx or \xx command is encountered. This effectively means that the plugin dropdown list does not change the macro itself — it is only there to help you pick the correct parameter for the macro. It also means that one and the same macro can control the same parameter of several plugins. For example, the macro F0F08Fz may control parameter 15 of any loaded plugin. Plugin parameter macros may also be assigned from the plugin window.
- **MIDI CC**: Sends a MIDI Control Change to the active plugin. The actual MIDI CC can be chosen from the dropdown list below.
- **Channel Aftertouch**: Sends a channel aftertouch message to the active plugin.
- **Polyphonic Aftertouch**: Sends a polyphonic aftertouch message to the active plugin. The last note (the "n" character in the macro) triggered on the same channel as the MIDI Macro is automatically embedded into the MIDI message.
- **Custom**: Allows you to enter a custom macro.

The **Value** edit field shows the actual macro. You can enter a custom macro here, but it must follow the macro syntax described above. Custom macros are for example useful for sending raw MIDI events to plugins.

Fixed Macros

Here you can configure the 128 fixed macros. From the **Preset** list, you may choose one of the following presets:

- **Unused**: All fixed macros do nothing.
- **Z80-Z8F controls Resonance (default)**: Sets the resonance amount of the resonant filter. Z80 means non resonance, Z8F full resonance.
- **Z80-ZFF controls Resonance**: Same as above, but with increase granularity. Z80 means non resonance, ZFF full resonance.
- **Z80-ZFF controls Cutoff**: Sets the cutoff frequency of the resonant filter. This is identical to the default parametered macro, so it is pointless to use both in the same track.
- **Z80-ZFF controls Filter Mode**: Toggles the filter mode of the resonant filter. Z80 activates the lowpass filter, Z90 activates the highpass filter.
- **Z80-Z9F controls Resonance + Filter Mode**: Z80 through Z8F set the resonance of the resonant filter (like the first preset), Z90 activates the lowpass filter, Z92 activates the highpass filter.

- **Z80-ZFF controls Channel Aftertouch**: Sends a channel aftertouch message to the active plugin.
- **Z80-ZFF controls Polyphonic Aftertouch**: Sends a polyphonic aftertouch message to the active plugin. The last note (the "n" character in the macro) triggered on the same channel as the MIDI Macro is automatically embedded into the MIDI message.
- **Custom**: This "preset" is shown if you customize any of the 128 fixed macros. For example, you may copy any of the parametered macro presets to a filtered macro and replace the **z** character by two definite nibbles.

Choose a macro from the **Customize** dropdown list to edit any of the fixed macros.

Other Controls

When using a non-default macro configuration, the **Embed macro configuration** box has to be checked. When closing this dialog, OpenMPT will display a warning if the option is not checked but is actually necessary. If macros are not embedded into the module file, OpenMPT will **always** assume the following default macro configuration:

- The first parametered macro controls cutoff.
- All other parametered macros do nothing.
- Fixed macros Z80 through Z8F control resonance, Z90 through ZFF do nothing.

This default macro configuration must not be confused with the default user macro configuration, which is used for all newly created tracks. If you happen to use a certain combination of parametered and fixed macros in many tracks, you can click the **Set as default** button to automatically load this macro configuration for all newly created tracks. It is explicitly **not** used for tracks which do not have macro information embedded.

MIDI Mapping

MIDI Mapping allows you to map certain incoming MIDI messages to plugin parameter changes. You can call this dialog from the View menu or by pressing Shift while modifying a parameter in an active plugin GUI. The modified plugin and plugin parameter are automatically filled into the appropriate fields.

MIDI Mapping settings are saved in modules, so they do not have to be re-entered when loading a previously edited module.

MIDI Mapping Dialog
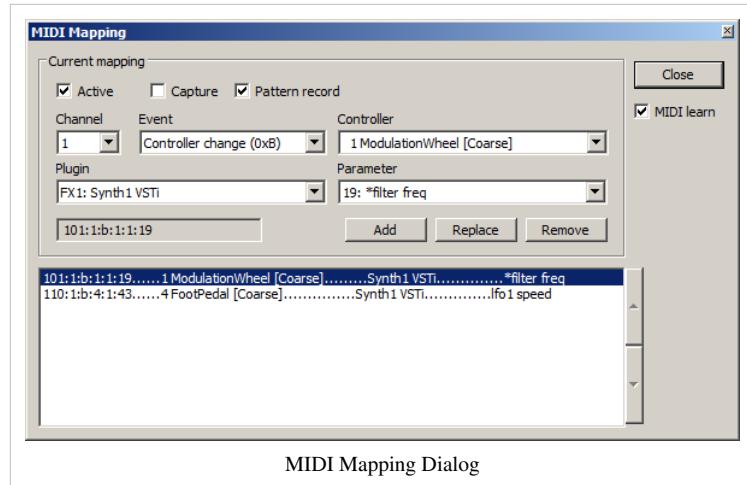
Current Mapping

This is the currently edited MIDI Mapping.

- **MIDI Learn**: When this box is checked, OpenMPT will listen for incoming MIDI events and fill in **Channel**, **Event** and **Controller** values automatically.
- **Active**: Checking this box enables this MIDI Mapping.
- **Capture**: Checking this box prevents the raw MIDI message from being transmitted to other MIDI Mappings listening to the same MIDI event or even other parts of the program such as any open plugin editors or the pattern editor, where the controller change may be written down as a MIDI Macro command.
- **Pattern Record**: Checking this box will enter the parameter change into the Pattern as a Parameter Control Events, so it is only available in MPTM tracks.
- **Channel**: The MIDI Channel (1 − 16) OpenMPT will listen on to capture this event / controller change combination. When choosing **Any**, will listen on all MIDI channels for this event.
- **Event**: Currently there is only one MIDI event type OpenMPT can listen for: MIDI Control Changes (also known as MIDI CCs). Other event types cannot be used for controlling plugin parameters through MIDI Mapping yet.
- **Controller**: The MIDI CC message that OpenMPT will listen for to control the plugin parameter. Clicking on the field shows a list of MIDI CC messages from which you can choose.
- **Plugin**: The plugin that will be controlled by this event. Clicking on the field will open a list of the loaded plugins.
- **Parameter**: Here you can assign the plugin's parameter you wish to control with the MIDI CC event. Clicking on the field shows a popup menu where you can choose the plugin's parameter to control.
- **Add Event**: Clicking on this button adds the event settings above to the MIDI Mapping list.
- **Replace Event**: Clicking on this button replaces the currently selected MIDI Mapping in the list with the event settings provided above.
- **Remove Event**: Clicking on this button removes the currently selected entry from the MIDI Mapping list.

The text field in the lower-left corner of the current mapping group shows a textual representation of all the above settings. The first three numbers represent the check boxes, the following numbers indicate the MIDI channel, MIDI Event type, MIDI CC, plugin number and plugin parameter number.

MIDI Mapping List

The MIDI Mapping list shows all available MIDI Mappings. You can use the **Up** and **Down** buttons to rearrange MIDI Mappings that cover the same MIDI event. The order of such MIDI Mappings may be crucial since the **Capture** setting can prevent an incoming MIDI event being redirected to subsequent MIDI Mappings.

Edit History

You can view this dialog by selecting "Edit History..." from the View menu, but is only available for IT and IT-type files. This dialog lists the load events, displaying the timestamps for each time the file was loaded into the tracker. The first entry is when the track was created (if the history was never cleared). At the bottom of the window is the total time elapsed while the file was open, and the number of times the track was loaded. Clicking on the Clear button will erase all of this data, but the info is lost only if you save the track afterwards.
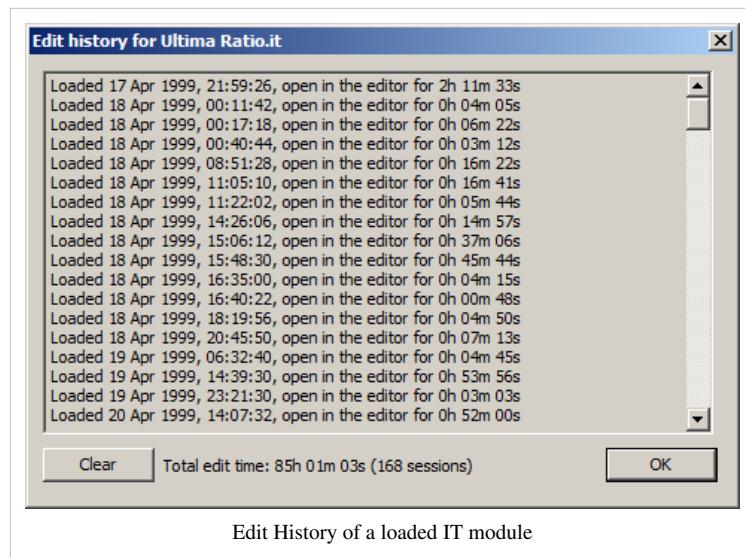
Edit History of a loaded IT module

Cleanup Manager

The Cleanup Manager allows you to strip away or rearrange various aspects of your track. The interface is self explanatory, and when you move your mouse cursor over a checkbox, Help Tips describe what each one does. No cleanup is done until the OK button is clicked. Keep in mind that not all cleanup actions can be undone, so it is advisable to save your track before applying cleanup.

Patterns

There are options to remove all patterns, only the unused patterns, or rearrange them in sequential order (according to when they appear in the Order List). Note that patterns are always rearranged when removing all unused pattern.
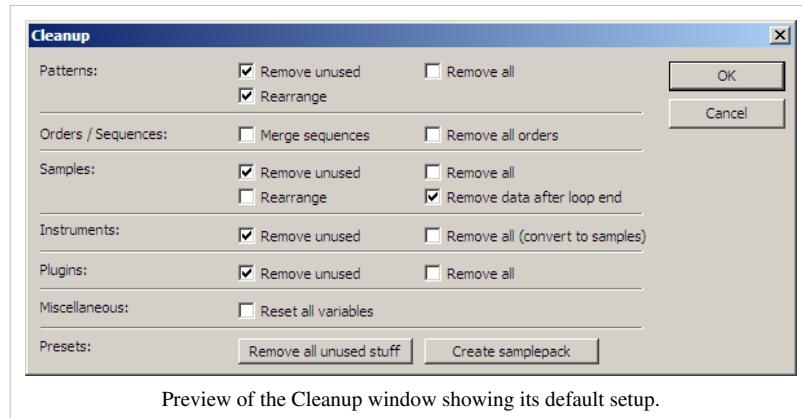
Preview of the Cleanup window showing its default setup.

Orders/Sequences

There are options to clear the order list, or to merge all sequences into one sequence. This helps when exporting or converting from one track format to another, especially from MPTM.

Samples

There are options to remove all sample slots, remove only those that are not called from within any pattern, or rearrange them sequentially. These is also an option to trim all samples so that data after their sample loops — if any use one — is deleted (audio after sample loops is never reached during playback, in all circumstances).

Instruments

There are options to convert all instrument slots to sample slots (and delete all instruments), or to remove all instrument slots that are not called in any pattern.

Plugins

There are options to remove all plugins (clearing all of their slots), or to remove only those that are not referenced by any channel or instrument and that are not master plugins.

Miscellaneous

This option converts the track to IT format and resets all settings to the IT default. This is useful for re-using samples from another song in a new track, for example when creating a sample pack for a competition (see below).

Presets

Clicking on any preset button sets the checkboxes in a default way. For example, clicking "Create Samplepack" will set the checkboxes for removing all patterns, orders, and instruments, while keeping all the samples (but rearranging them in sequence). With any preset you can still enable or disable any of the default checkboxes.

Channel Manager

The Channel Manager allows you to configure some attributes of all channels at once. You can Mute / Unmute, toggle Record Select, toggle a channel's plugin assignments, or reorder or remove channels. Note that you cannot rename channels here, and once any function is applied and this window closed, you cannot use Undo to revert the channels to a previous state.

There are two states a channel in this window can be in — selected and / or enabled. Selecting a channel will turn its plate white, while de-selecting it will turn it back to grey. Enabling a channel will change the colour of the status light (on the left side of each channel's plate), but the meaning of each colour depends on the attribute you are changing. Note that channel selection is independent of channel enabling.

There are different ways to activate functions in each window, but here are the things that are common to all of them:

- **Select All**: Selects all of the channels at once.
- **Invert Selection**: Selects all channels not currently selected, while de-selecting those that are. To select all but one channel, select the channel you don't want, then click on Invert Selection.
- **Store**: Remembers the selection state and the enabled state of each channel in a temporary memory. Each page has its own memory, so you can store the settings for each channel, for each page.
- **Restore**: Reverts the channel settings from memory to their previous states when they were last stored (except in the Reorder / Remove page, which enables all channels and returns them to their previous positions, since the last Apply).

The rest of the options differ between pages and are described below:

Solo/Mute Channels

In this page you can quickly mute and unmute many channels at once. You can also designate one or more channels as a Solo channel, which mutes all other channels.

A solo channel is indicated by a green icon, muted channels have a red icon. A normal unmuted channel′s icon has the same colour as the window′s background.

- **Left-click**: Sets the clicked channel to Solo, which mutes all other channels.
- **Right-click**: Toggles the Mute status of the clicked channel.
- **Control + Left-click**: Selects the channel.
- **Control + Right-click**: De-selects the channel.
- **Solo**: Toggles the selected channels between Solo, which enables the Mute of all other channels, and Unmuted.
- **Mute**: Toggles the Mute status of the selected channels.
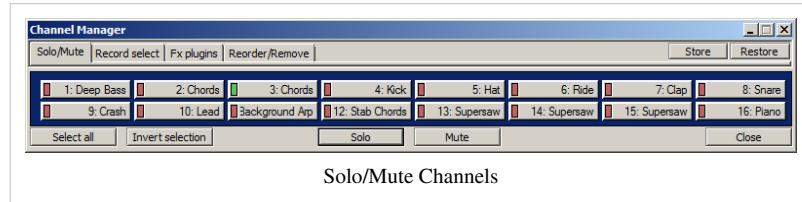
Solo/Mute Channels

Record Select

In this page you can set up which channels should be used for live recording. There are two record groups which can be used independently for entering notes into. If the edit cursor is in either group, it will stay in channels designated to this group while entering notes. If the edit cursor is in neither group, it will stay on the same channel while entering notes. A channel can only be part of one record group at a time.

- **Left-click**: Toggles assignment to the first record group. A green icon indicates that the channel is assigned to this record group.
- **Right-click**: Toggles assignment to the second record group. A red icon indicates that the channel is assigned to this record group.
- **Control + Left-click**: Selects the channel.
- **Control + Right-click**: De-selects the channel.
- **Instrument 1**: Assigns all selected channels to the first record group, or removes them from the record group if they previously were all part of the first record group.
- **Instrument 2**: Likewise, this assigns all selected channels to the second record group, or removes them from the record group if they previously were all part of the second record group.
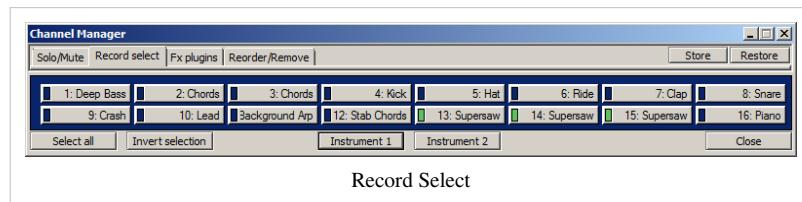
Record Select

FX/Plugins

In this page you can enable or disable the audio processing of each channel′s assigned plugins (if any). Channels with enabled plugins are marked with a green icon, "dry" channels use a red icon. Note that instrument plugins are not affected by this setting.

- **Left-click**: Enables plugin processing on this channel.
- **Right-click**: Disables plugin processing on this channel.
- **Control + Left-click**: Selects the channel.
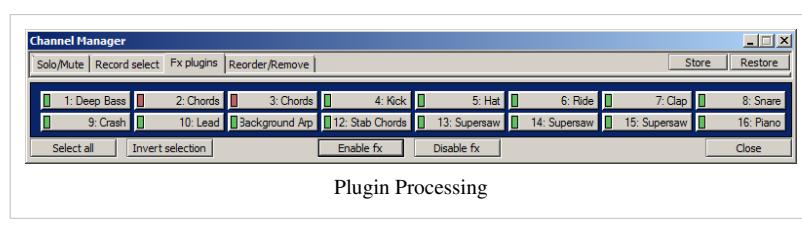
Plugin Processing

- **Control + Right-click**: De-selects the channel.
- **Enable FX**: Enables all selected channels' plugins.
- **Disable FX**: Disables all selected channels' plugins.

Reorder/Remove

The effects of this page are unalterable, so use with care. Here you can alternate channel positions, moving them around by clicking and dragging, as described below. At the same time, you can also remove channels.

A green icon indicates that the channel will be kept, a red icon means that a channel will be removed if **Apply** is hit.

- **Left-click**: "Grabs" the selected channel's plate(s) so you can move it to a new location. Drag the selection to another channel, release the mouse button, and the selected plate will be placed **before** the chosen channel.

Reorder / Remove
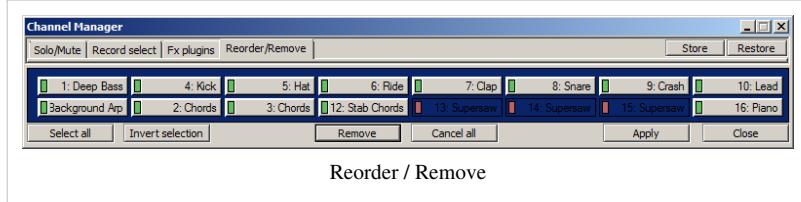
- **Right-click**: Toggles the designation for the channel's removal. When a channel is enabled, it will remain after removal is applied. When it is disabled, it will be prepared for deletion. If you close the Channel Manager without applying, the channels' deletion order will be reset and nothing will be applied.
- **Control + Left-click**: Selects the channel.
- **Control + Right-click**: De-selects the channel.
- **Remove**: Designates the selected channels for removal.
- **Cancel All**: Restores the positions and removal state of all channels.
- **Apply**: Reorders the positions of the channels in the track, and removes all disabled channels from the track and compacts the channels. **This action is permanent!** You cannot restore the deleted channels. If you deleted channels by mistake, you will need to load the last saved (or autosaved) version of the track.

Find and Replace

The Find Page

You can search for the data that meets the criteria you enumerate below, starting where the cursor is in the Pattern Editor. After you enable at least one of the search criteria and fill in the required target data, you can press OK and the search begins in the location you specify in the Search Range limits at the bottom of the page. The search starts in the first row and checks each channel, then proceeds to the next row after all channels in the range have been searched. If an instance that meets the criteria is found, the cursor is positioned there and the field is highlighted.

You can continue searching using the Find Next command (in the Edit Menu or its keyboard shortcut) even if you edit the highlighted data.

Find Page

- **Search for Note**: Checking the box will use the note criteria as part of the search query. Clicking on the field below it shows a popup menu where you can choose any note, a particular note, or a note message (like Note Cut) to search for. Parameter Control Events are considered note messages and can be queried here.

- **Search for Instrument**: Checking this box will include the instrument criteria in the search query. Clicking on the field below it shows a popup menu where you can choose a particular instrument to search for.

- **Search for Volume Column Effect**: Checking this box will include the volum column effect criteria in the search query. Clicking on the field below it shows a popup menu where you can choose a particular volume column command to search for. The available commands depends on the track type.

- **Search for Volume Column Parameter**: Checking this box will include the volume column parameter criteria in the search query. Clicking on the field below it shows a popup menu where you can choose a value to search for.

- **Search for Effect Column Effect**: Checking this box will include the effect column effect criteria in the search query. Clicking on the field below it shows a popup menu where you can choose the command to search for. The available commands depends on the track type.

- **Search for Effect Channel Parameter**: Checking this box will include the effect column parameter criteria in the search query. Clicking on the field below it shows a popup menu where you can choose a value to search for.

- **Search Range**: The last two items define the range where you can execute the search. Click on a radio button to conduct a search either only in the current pattern, the current selection, or in all patterns. If you want to narrow the search to only one or more contiguous channels, check the box and fill in the range of channels.
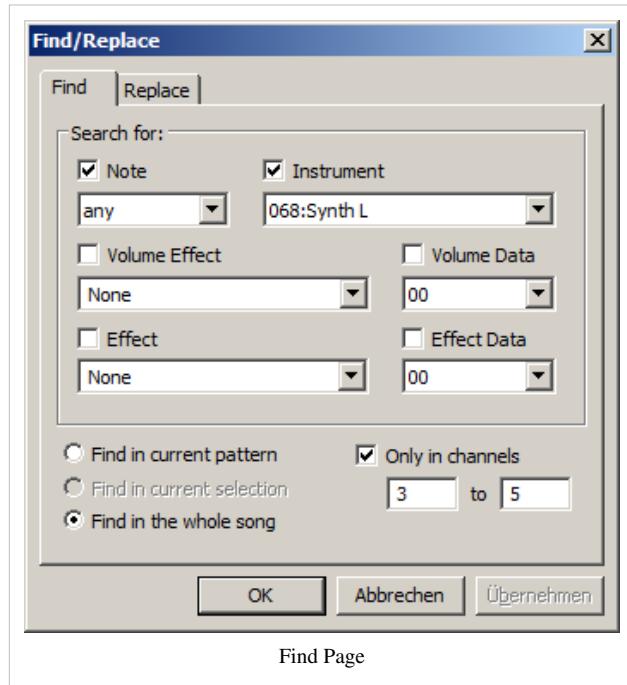
The Replace Page

You can also choose to have certain data replaced along the way, which saves time instead of entering the data yourself. To do a Find & Replace, enter the Find criteria on the first page, then chose some values to replace with in this page. The "Replace By" box is then checked automatically. Keep in mind that the data does not have to be the same type as that which was queried. For example you could so a search for all Note Fades, and in each instance where one is found, you could use Replace to enter a volume effect without deleting the Note Fade.

To use Replace, enable the checkbox for each data item type and choose the correct data to be entered. Before clicking OK, make sure the Replace All box is checked for a complete search-and-replace (it is set by default); if the check box is not activated, you will be prompted each time the Find routine locates the target data, and you can choose to replace it one-by-one.

Replace Page

When the Replace function is executed, an Undo step is created, so you can undo your changes if you need to. Replacing one-by-one (the Replace All is not set) enters each replacement normally into the Undo memory, but when you use the Replace All option, all replacements are entered as one step, so that using Undo will delete the entire set of modifications made by this dialog.
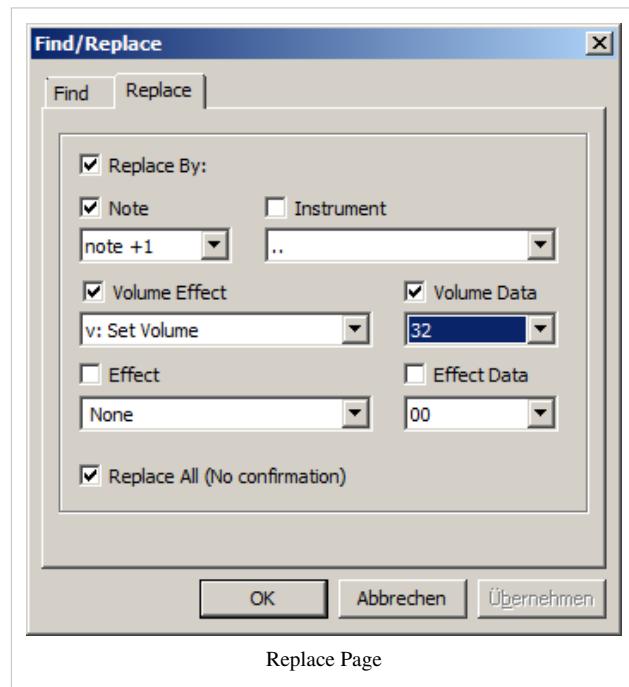
Limitations

Currently you cannot search based on position in a pattern (every x row or beat) nor in discontiguous channels (such as only channels 5, 8, or 10). You can only apply simple one-event criteria to replacing; for example, you cannot place a drum note into every row after a kick was made in the previous row. Nor can you replace values by addition / subtraction or percent - there is an option to transpose notes by one semitone or octave, though.

Pattern Properties

Pattern Size

To change the number of rows in the pattern, either type the number into the text field, or click on the menu arrow to choose from a list. MOD and S3M files have an unchangeable number of rows (64), but with XM or IT (or IT-type) formats, you can choose from 1 to 1024 rows. To quickly halve or double the number of rows, click on the "/2" or "x2" buttons. If you are reducing the number of rows, and there is event data in the rows that are being deleted, you will be alerted that this data will be lost, and you can back out if necessary.
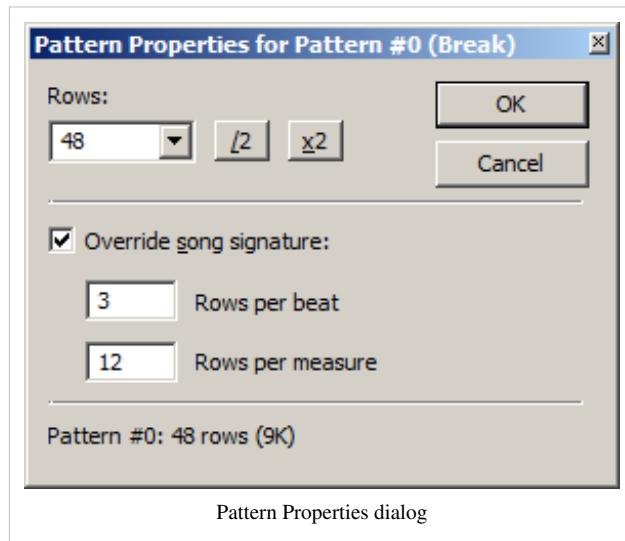
Pattern Properties dialog

Time Signature

For MPTM tracks, you can enable per-pattern Time Signatures by setting the "Override" checkbox. Then enter the Rows per Beat and Rows per Measure values that you want to apply to this pattern only.

At the bottom is a reminder of the pattern you are modifying, the current number of rows, and the amount of memory it consumes.

Chord Editor

The Chord Editor is used to define to configure the preset chords that can be entered into the Pattern Editor by holding the chord modifier key.

Chord Manager window

- **Shortcut Key**: The note that, when input, will trigger the chord input. When using the computer keyboard for input, you should use a note outside of the range of notes you will be entering into the Pattern Editor; you can also provide a keyboard shortcut to trigger this note. When using a MIDI keyboard for input, just use notes at the far end of the keyboard controller; this makes it much easier to enter chords.

- **Base Note**: The base note of the chord; however, it doesn't have to be the lowest note of the chord.

- **Notes 1 − 3**: The alternate notes that will be input in the other channels being recorded into.

- **Chord Diagram**: The piano keyboard representation of the chord, with red dots indicating which notes belong to the chord. You can click on any note in the diagram (up to 4 at a time) to set the note into the chord, but when using this method it's best to start out with no notes assigned except the base note. When clicking on a note, the chord is reconsidered and the notes are placed in the "Note #" fields according to the sequential order on the keyboard diagram. To remove a note assignment, click on the red dot so it is deleted.
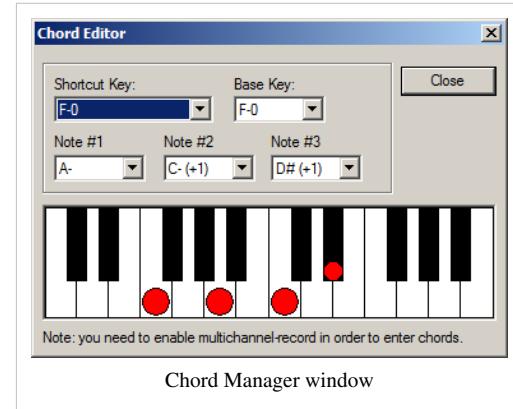
Parameter Editor

The Parameter Editor window is the most graphical display of pattern data in OpenMPT. The window does not only show the effect values for one channel (the first channel within the selection) for the selected rows, but you can also modify the data with a few actions. The Parameter Editor can also be used to set the parameter values of plugin Parameter Control Events.
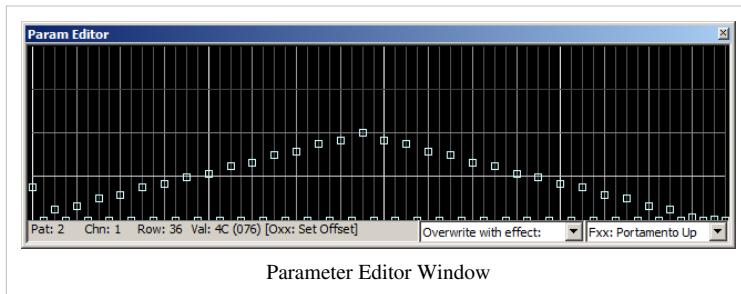
Parameter Editor Window

Each vertical line represents one row in the pattern; effect values are implied up and down these vertical rods, with higher values at the top of the grid. The squares are handles that indicate the relative value, and these can be dragged up or down their axis to change the effect value. Left-clicking allows you to "paint" values across several axes, while right clicking allows to drag only the one selected. It should be noted, however, that the effect command is not considered; so if you have a channel with different effect commands, all values are displayed here, no matter what command they belong to.

In the bottom left corner is some helpful info that translates the mouse cursor position on the parameter editor to a pattern position. From left to right, there is the pattern number, the channel number, the row number, and the effect value at the mouse cursor position.

In the bottom right corner are two fields indicating first, the action to execute when clicking in the window, then second, the effect command to apply. Clicking on the field will open a popup menu where you can make your selections. To use the window, slide a square along a vertical axis, or click at an axis and drag the mouse to shape

how you want the values to interpolate. Doing so will apply values according to the following actions:

- **Overwrite with effect**: When clicking or dragging in the window, the value will be placed in the corresponding row and will apply the effect command you have selected in the second field, overwriting any existing effect commands.
- **Fill blanks with effect**: When clicking or dragging in the window, the value will be placed in the corresponding row and will apply the effect command you have selected in the second field only in rows where there are no existing effect command yet. If there is already a different effect command on the row, its parameter value is updated, but the effect type is not changed.
- **Overwrite with PC Note**: Same as "Overwrite with effect", with the difference that it inserts Parameter Control Events instead of a specified effect command.
- **Fill blanks with PC Note**: Same as "Fill blanks with effect", with the difference that it inserts Parameter Control Events instead of a specified effect command.
- **Never change effect type**: This is similar to "Fill blanks with effect", but with the difference that no effect is written into blank effect cells.

Keep in mind that, while the values you modify are updated immediately in the channel (and vice versa), modifications only occur in the channel in which the Parameter Editor was opened. To edit values in another channel you have to choose Visualize Effect again from the contextual menu in another channel (or type its keyboard shortcut).

Note Properties

Reachable from the pattern editor by double-clicking a pattern cell or hitting the Application key, this dialog offers quick access to all parameters of a pattern cell and can be used to get some basic information about effects that are entered into the pattern editor. When editing any parameter, the chosen value is entered immediately into the Pattern Editor.

Note Tab

Shows the current note and the instrument assigned to the selected pattern cell. Clicking on the note field opens a popup menu where you can choose the note or note message.

Depending on the file format used, you can only choose "No Note" or a given

Note Properties — Note Tab

note, or special commands to cut or otherwise end instrument playback. When working with the MPTM format, you can also choose a Parameter Control Event.

Clicking on the instrument field shows a popup list of all the loaded samples / instruments from which you can select.
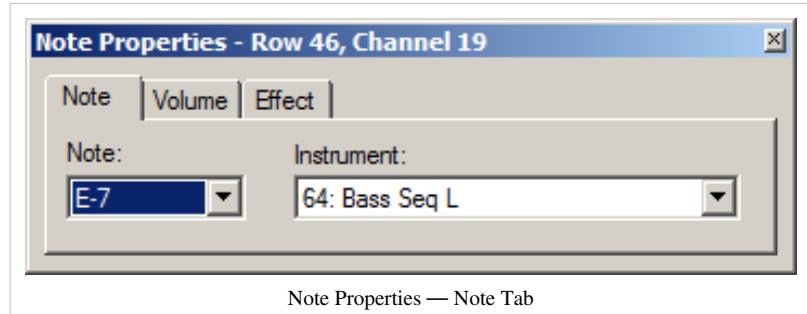
Volume Tab

Shows the available commands that can be entered into the volume column (not available in the MOD format). Contrary to the name of this column, there are also panning and pitch-bend commands available, depending on the format used. See the Effect Reference to get a list of supported volume column commands for each format.

Note Properties — Volume Tab
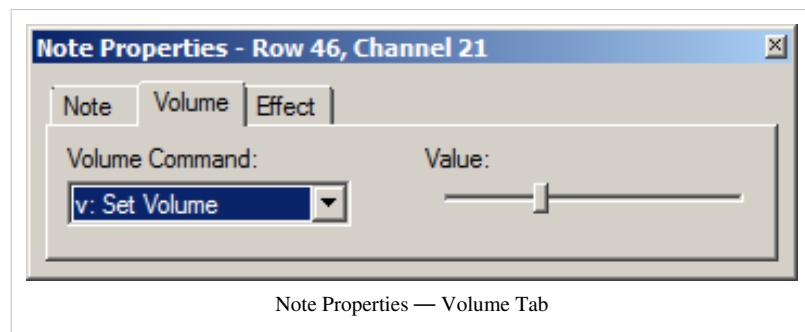
Effect Tab

Shows the available commands that can be entered into the effect column. Depending on the chosen effect, you also get an explanation of its parameter next to the parameter slider. See the Effect Reference to get a list of supported effect column commands for each format.

Note Properties — Effect Tab
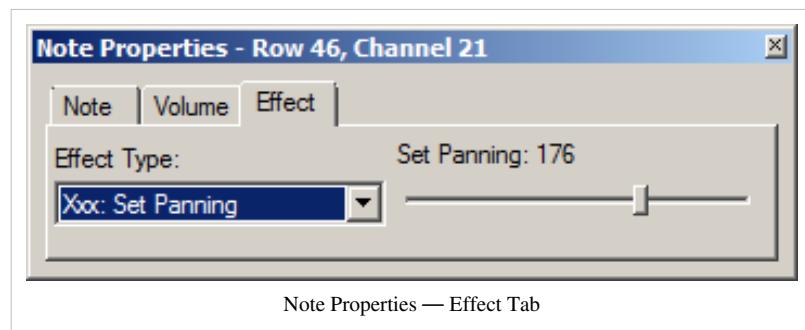
Quick Channel Settings

Middle-clicking or Ctrl-right-clicking a channel header (the boxes that hold the channel names and VU meters) in the Pattern Editor brings up the quick channel setings, where a channel's basic settings can be adjusted without having to go back to the General Tab. The dialog is floating on top of the pattern editor and can be closed by clicking the pattern editor again.

Quick Channel Settings dialog
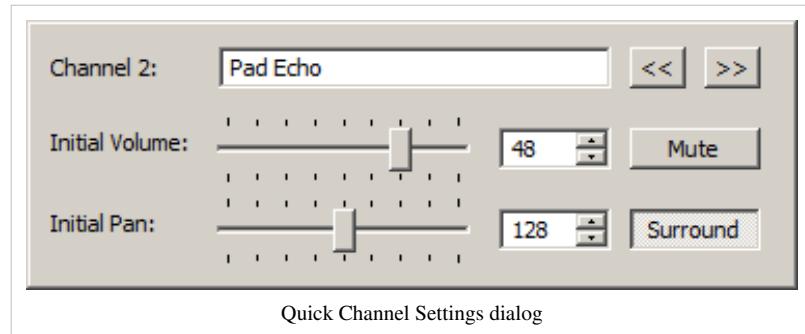
- **Channel Name**: The edit box at the top of the dialog is used to edit the channel name.
- **Previous / Next Channel**: Next to the channel name are two arrow buttons for switching to the previous or next channel.
- **Initial Volume**: Depending on the current module format's capabilities, you can adjust the channel's initial volume here and toggle the mute status.
- **Initial Pan**: Depending on the current module format's capabilities, you can adjust the channel's initial panning position and surround status here.

The channel plugin assignment can be edited directly from the pattern editor and is thus not available from this dialog.

Amplify

The Amplify Dialog is used to amplify section of a pattern or a sample.

- **Amplify Amount**: The percentage to amplify the selected data. When using this dialog from the Sample Display, you can enter negative amounts, which will both invert the sample phase of the selection as well as perform the amplification.
- **Fade Type**: Check one or both of the Fade Type boxes to have a ramped amplification enabled. When doing a Fade In, the

amplification data is interpolated from 0 to the amplified amount within the selection; Fade Out goes the opposite way.
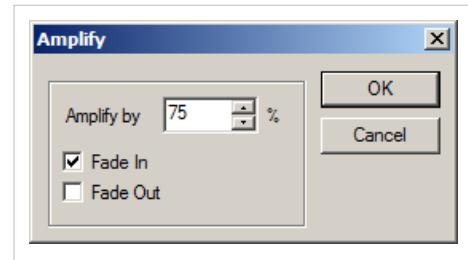
Keyboard Split

You can apply a different instrument based on which note is entered into the Pattern Editor, by "splitting the keyboard." To activate the split, set any of the parameters in this dialog to non-default settings.

Entering a note in the Pattern Editor that is **below** the split point will apply the alternate instrument, volume and tranpose settings provided in this dialog. From the split point upwards, the main instrument is applied without any tranposition or default volume commands. Keep in mind that you may end up with two instruments in the same channel (unless you navigate to another channel), and may affect playback from the notes running into each other.
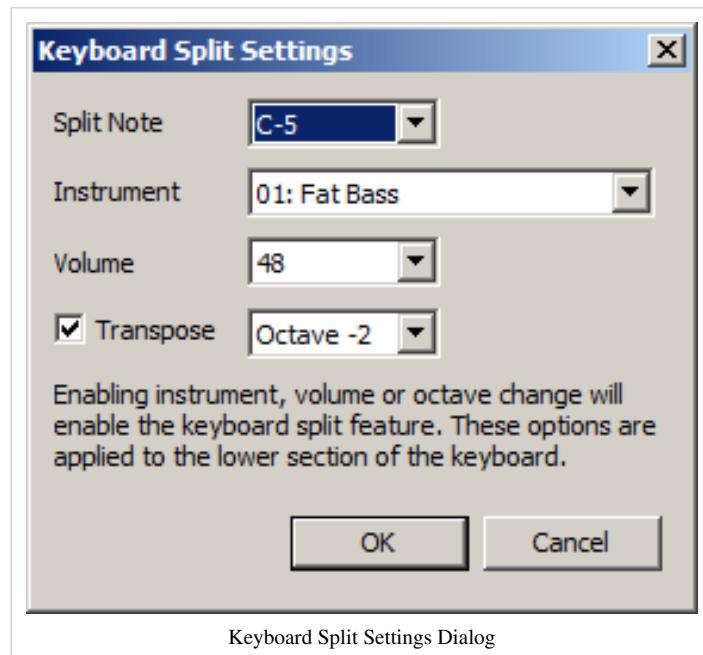
Keyboard Split Settings Dialog

- **Split Note**: If you input a note below this note (the split point), the alternate instrument will be entered instead of the current "main" instrument. Clicking on the note field opens a list of notes to choose from.
- **Instrument**: If you choose an instrument from this list, it is applied when entering a note below the split point. By default, the main instrument is used.
- **Volume**: If you choose a number from this list, a corresponding volume change command is entered with notes below the split point.
  You can use this setting to automatically add a volume command to all notes entered into the Pattern Editor by setting the Split Point to the highest possible value. This will actually apply the split settings, including volume, to all but the very highest note. If you do this, it is a good idea to not set an alternate instrument or apply transpose settings.
- **Transpose**: This box is automatically checked when an Octave Shift setting is chosen.
- **Octave Shift**: If enabled, all notes entered below the split point are transposed up or down by the chosen amount. This function is useful e.g. for keeping the split notes in the same range as the main instrument. For example, if

the Split Point is C-5, set the Octave Shift of the alternate instrument to "Octave +2". Then when you press the keys for notes C-3 through B-4, they will be entered as C-5 through B-6 automatically.

The following example demonstrates which parts of the keyboard are assigned to which instrument if the split note is C-5:
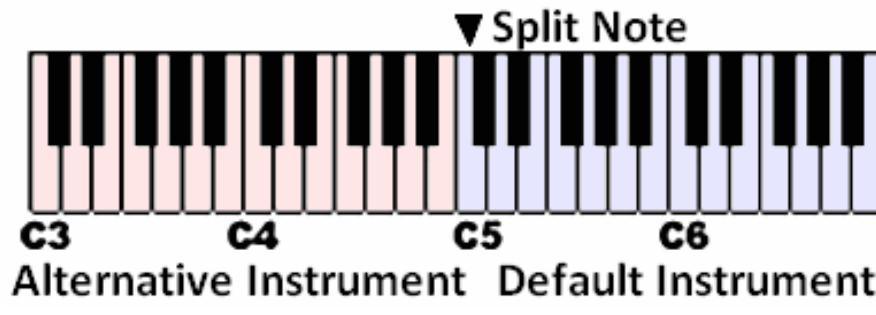
When working with two record groups, notes belonging to the default instrument are automatically written to the first record group and notes belonging to the alternative instrument are written to the second record group. This can be very useful for example when recording both a bass and a lead melody from an external MIDI keyboard simultaneously.

Time Stretch Calculator

The Time Stretch Calculator is used to modify the length of samples and can be accessed from the Sample Editor.

Time Stretch Calculator

- **Sample Length**: Shows the original length of the sample in sample data points, and the new length which you can enter in its field.
- **Time Length**: Shows the original length of the sample in milliseconds (when played at middle C), and the editable length.
- **Speed**: You can fit the sample to play within a certain number of rows, but here you must set the ticks per row (speed) for its calculation. Tempo: You can set the running tempo of playback, but keep in mind the actual BPM is determined by the song's Tempo Mode.
- **Playback Length**: Shows the original length of the sample in rows (based on the Speed and Tempo settings), and the new length which you can enter in its field.
- **Ratio**: Shows the amount of lengthening in percent that will occur based on the given data above. This is updated when you change any of the previous settings, or you can enter a general percentage.
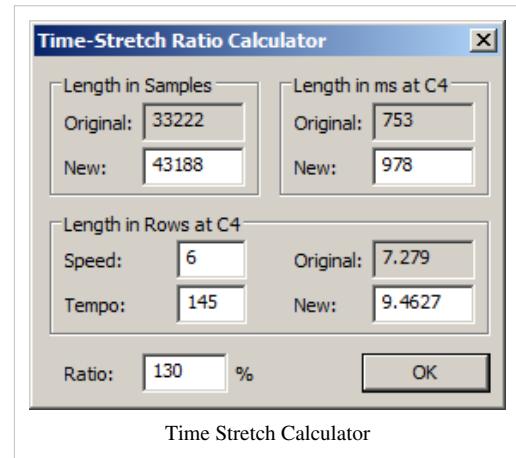
Sample Tuner

The sample tuner can be used to tune melodic instrument samples to a given note. Applying the sample tuner to all melodic sample of the same tune can help getting rid of detuned samples.

Considerations

In order to use the sample tuner successfully, it is important to know how it basically works:

- The whole sample (or a selection) is analysed using autocorrelation [1] to find its fundamental frequency. Thus, if you have a sample that consist of more than one distinct note in some way (e.g. a whole melody), you should reduce the sample selection to exactly one note for analysis — otherwise, the algorithm cannot decide properly which of the notes is the base note that should be considered for finding the fundamental frequenvcy, as there will be several predominating frequencies.
- The sample tuner does no resampling - it merely changes the C-5 frequency of the sample.
- Finding the fundamental frequency may not work well if the sample frequency is too low. If the results are not satisfactory, increase the sample frequency and try again.
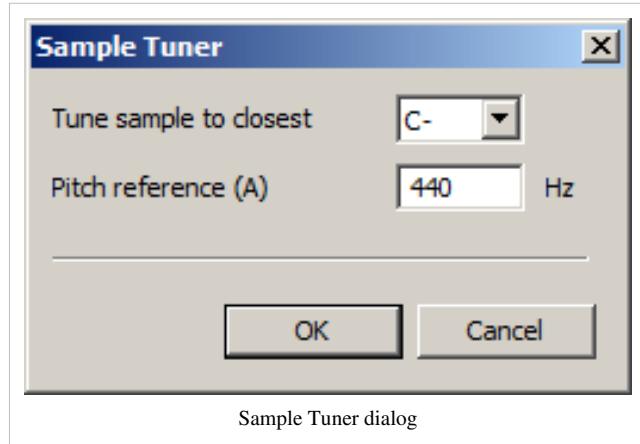
Using the Sample Tuner

If the above instructions are considered, the sample tuner is easy to use: Simply select a **target note** to which the sample should be tuned and a **pitch reference**. In most cases, you would not want to change the pitch reference, since many real-world instruments are already tuned to 440 Hz, but if you wish to use a different tuning, you can of course do so.

References

[1] http://en.wikipedia.org/wiki/Autocorrelation

Sample Map

The sample is used to create a mapping between samples and instruments.

- **Current Sample**: Shows the current sample assigned to the shown keys. Clicking on the field opens a popup menu listing all associated samples (or of all loaded samples if the "Show All Samples" box is checked), where you can choose the sample to map.

Sample Map window

- **Sample Notes**: Displays a keyboard where you can assign the current sample to a note by clicking on it (the note where the mouse is located is shown on the bottom-right corner of the dialog). A red dot shows the assignment. If you click on a note that was already assigned, your new assignment overwrites the previous sample. The only way to delete a sample assignment is to choose "No sample" from the Sample list and click on that note.

- **Octave Range**: Moving the slider shifts the octave range the keyboard display represents.
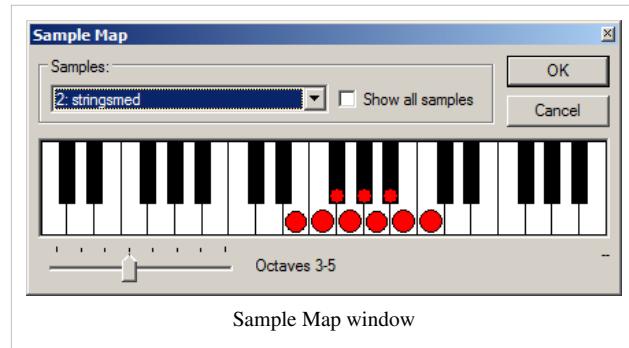
Scale Envelope Points

Instrument envelopes can be scaled both horizontally (x-axis) and vertically (y-axis) when choosing "Scale Points..." from their contextual menu. Keep in mind this does not affect the zoom factor of the Envelope window, it only modifies the envelope itself.

On the x-axis, the envelope points are be multiplied by the factor in the first field in this dialog window. Entering 2, for example, will double the width of the envelope (shifting its points respectively), while 0.5 will halve it.
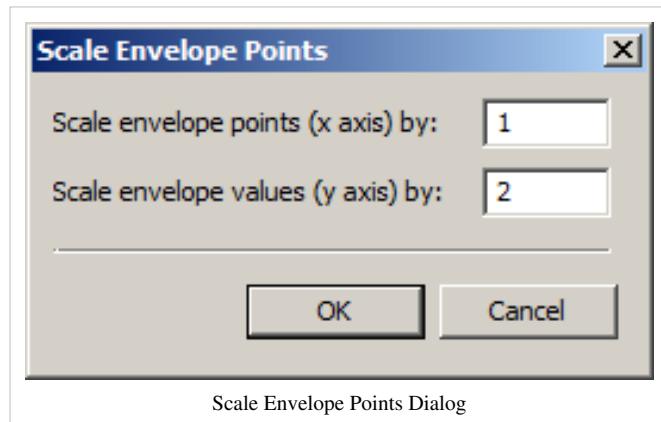
Scale Envelope Points Dialog

You can also increase or decrease the values of the envelope points by scaling the y-axis in the same way. A factor of 2 will double the values (expanding the envelope up) and 0.5 will halve the values. Due to their nature, the pan and pitch envelopes (the latter only when **not** being used as a filter envelope) have their x-axis centered; this means that entering values greater than 1 will increase the panning / pitch range of the envelope, values less than 1 will decrease it.

You may also use negative numbers for the pan and pitch envelopes, which will invert the envelope in relation to the x-axis (pan or pitch center).

Tuning Properties

The Tuning Properties dialog is used to create and edit advanced sample tunings.

Tuning Properties dialog

Collection List

This is the big list on the left side of the window. It keeps all the tunings that you have imported into OpenMPT. There are four categories of tunings available:

- **Standard tunings**: This list contains standard tunings that are built into the tracker and cannot be altered. You can, however, copy tunings from this category into another another category and subsequently edit them.
- **Local**: Tunings that are saved with the current OpenMPT installation. These tunigs are kept in the LocalTunings.tc file.
- **Tune-Specific**: Tunings saved with the current song.
- **Sandbox**: Temporary tunings that are lost when the dialog box is closed. When importing a new tuning, it goes into this category.

Tunings can be moved and copied between categories by dragging them to the wanted category. When releasing the mouse button, a popup menu is displayed from which you can choose the desired action — moving or copying the tuning.

Right-clicking a tuning collection allows you to add a new tuning.

Collection Information

The Tuning Collection frame holds information about the currently selected collection. Most of this information is not very interesting, however on the right side of the frame, you can view the location of the tuning collection (if it is stored on disk rather than in a song or in OpenMPT itself), and you can also directly save the collection to disk.

Editor

- **Read Only**: Prevents any further editing of the current tuning.
- **Name**: Here, you can give your tuning a name that is shown in the tuning collection.
- **Tuning Type**: Determines how the tuning is built. The following types are available:
  - **General** is a non-calculated tuning type where all note pitches have to be entered manually. While the obvious disadvantage of this type is that you have to set the pitch for every note, this setting is especially useful for unpitched, strangely-pitched, or unusually-named notes, such as experimental tones or drum sets.
  - **Group Geometric** allows pitches to be independent within a group (octave). The pitch of notes outside the group size is determined by the **Group Ratio** factor.
  - **Geometric** calculates by number of pitches in an "octave" (called a group size), and the pitch change in the "octave". Using this method applies the equal temperament algorithm (based on the twelfth root of 2), but there is a lot less flexibility in naming notes.
- **Group Size**: The number of notes in this tunings "octave" (which does not have to be an octave in the classic sense at all). You can enter a number in this field to define how many notes are in a note group (the Western European chromatic octave has 12 notes, the diatonic has 7, and the whole note scale has 6).

- **Group Ratio**: The frequency multiplier between the base note and the note one "octave" higher.
- **Finetune Steps**: The number of divisions that are between notes that will be used in portamento. In other words, the higher this setting, the higher the portamento value must be to bend the pitch by one note. If this value is 0, finesteps equals note steps, which is the same as a glissando effect, using the pitches in the note list.
- **Note List**: Shows all notes that can be played (C-0 to B-9) and the pitch ratio at each note. Clicking on any note centers the selection in the window, and shows the note attributes below the window. See the chapter on Tunings for more detailed info.

Other Controls

- **Import**: Clicking on the Import button opens a file dialog so you can tuning files (OpenMPT′s own .tc format, Anamark .tun tunings or Scala .scl tunings), which will put it into the Sandbox category.
- **Export**: Clicking on the Export button will open a file dialog where you can export the selected tuning into a .tun or .tc file.

VST

Plugin Manager

The Plugin Manager dialog can be found from the View menu or a song′s General Tab and allows you to register new plugins with OpenMPT and load them into the current track. It lists all plugins in a folder list, where any folder can be opened and viewed by clicking on the + next to it. Effect plugins are shown with a speaker symbol next to them, while Instrument plugins show a keyboard symbol.

Plugin Manager window

- **Plugin Filter**: Input a few letters to filter which plugins are shown. Any plugin whose name does not contain that character sequence is hidden. Remember to erase the contents of this field to show all plugins.
- **Plugin List**: Shows all plugins that have been loaded into OpenMPT. DirectX plugins that have been registered properly in Windows show up automatically in this list. Other plugins have to be added manually by using the "New Plugin" button.
- **Put in FX Slot**: Click on this button to load the selected plugin into the current plugin slot. This will actually create a reference for the track, and set up space for the plugin′s parameters. When opening the Plugin Manager by a shortcut key or from the main menu, the slot number given will be the first available slot.
- **Cancel**: Closes the window without assigning any plugins. If you loaded any new plugins into OpenMPT′s list of known plugins, however, those will remain.
- **New Plugin**: Opens Windows′ standard Open File dialog so you can locate a plugin to load into OpenMPT′s list of known plugins. OpenMPT support plugins that follow the Virtual Studio Technology [1] standard (commonly abbreviated VST), i.e. VST effect plugins and VST instrument plugins, and among these, only VST 1.x and VST 2.x plugins can be loaded. If the plugin type was not recognized, you will be notified and the plugin is not loaded.
- **Remove**: Removes the selected plugin from the Plugin List.
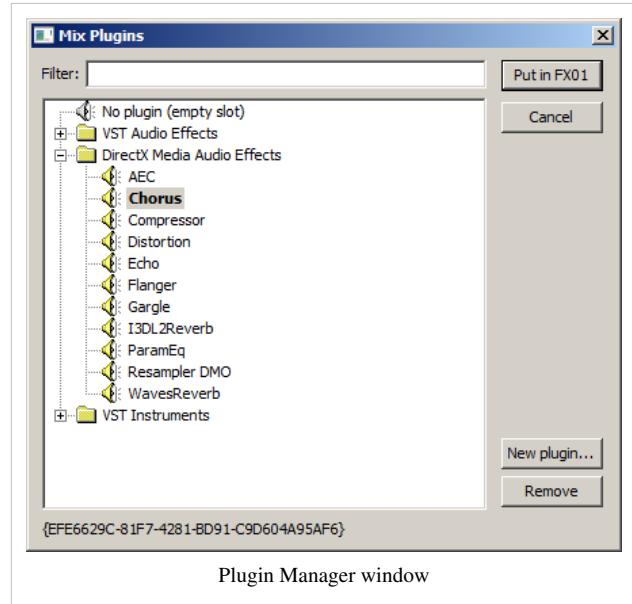
References

[1] http://en.wikipedia.org/wiki/Virtual_Studio_Technology

Plugin Window

Plugins can be controlled through their plugin window. Many plugins come with a custom GUI which is merely supported by OpenMPT's menu bar, but there is also a variety of plugins which do not bring their own GUI. In this case, OpenMPT provides a default GUI, shown in the first screenshot on the right, which allows for controlling all plugin parameters. Custom plugin GUIs often provide a better access to parameters, because they can be grouped visually, but at the same time they can get very complex and bloated.

Default Plugin Window

Menus

File Menu

- **Load Preset**: This allows you to load a single preset for this plugin from a .fxp file.
- **Save Preset**: This allows you to export the current preset / patch to a .fxp file.
- **Create instrument from plugin**: This command creates an instrument that is linked to this plugin.
- **Randomize Parameters**: This command randomizes all plugin parameters.

Custom Plugin Window
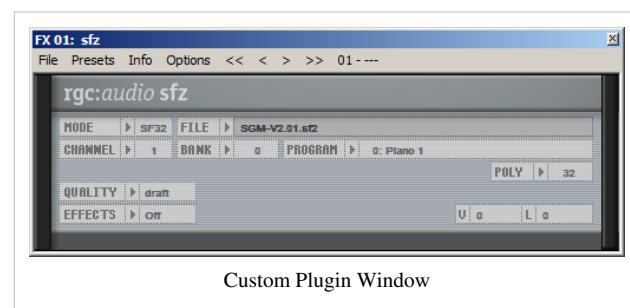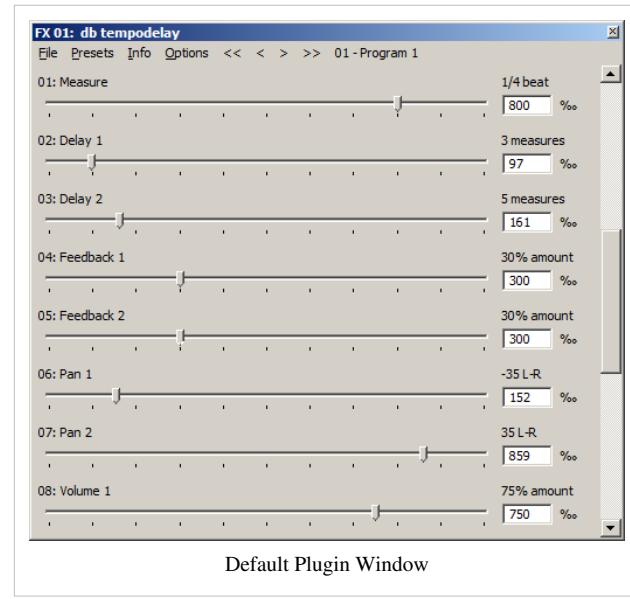
Presets

If the plugin comes with a set of presets, you can choose one from this menu.

Info

- In the **Inputs** sub menu, you can view all plugins that send their output to the current plugin's input. Click any of the menu items to open the listed plugin's editor. Additionally, all instruments which send sample and note data to this plugin are listed. If more than one instrument is assigned to the plugin, you can choose which instrument's plugin settings should be used when triggering notes in the plugin editor by clicking the appropriate entry.
- Similarly, the **Outputs** sub menu shows which plugins receive the output of the current plugin.
- The **Macros** plugin contains a list of all parametered Zxx macros. Macros that do not affect this plugin are greyed out, in contrast to plugins that can be used to automate a parameter of this plugin. Currently unassigned macros are labeled with **Learn Param**. Plugin parameters can be assigned to such a macro by clicking its menu entry and then modifying the parameter in the plugin GUI — for example by clicking a knob, dragging a slider or whatever kinds of controls the plugin may offer.

Options

- **Bypass Plugin**: This option excludes the plugin from the processing chain. No audio is routed through the plugin if the option is checked.
- **Record Parameter Changes**: When changing a plugin parameter from the GUI, this change is written to the pattern either using a Smooth MIDI Macros (\xx command in XM and IT tracks) or Parameter Control Events (in MPTM tracks). This is most useful when playing the module with the "Follow Song" option turned on.
- **Pass Keys to Plugin**: Some plugins need to process keyboard input, for example for entering a serial number or for typing in a preset name. Whenver this is necessary, you can enable this option to bypass OpenMPT's keyboard handling.

Preset Switcher

If the plugin has any presets, the plugin switcher buttons can be used for quickly navigating between presets. Normal arrows dial the next or previous preset, while double arrows Jump ten presets forward or backward.

Next to the switcher arrows, the current preset's name is displayed.

Miscellaneous

Instrument plugins can be previewed directly in the plugin editor using the same note keys as in the pattern, sample and instrument editors. The instrument notes are sounded as long as you hold the appropriate note key. Additionally, an external MIDI device can send MIDI events to a focussed plugin window if the appropriate option is enabled in the MIDI Setup.

Plugin parameters may also be controlled by external MIDI hardware through MIDI Mapping. The MIDI Mapping dialog can be opened automatically by pressing Shift while modifying a parameter on the plugin's editor.

Parameter Control Events

Parameter Control Events (sometimes also referred to as "PC Notes") are meant as a straight-forward replacement for Zxx MIDI Macros for automating plugin parameters. The key advantages over Zxx Macros are:

- More parameters: The first 1,000 parameters of each plugin can be automated.
- Increased granularity: The coarse 7-Bit automation range is extended to 1000 discrete values.
- No complicated setup: There is no need to configure a Zxx macro and no restriction to sixteen macros.
- Can be used anywhere: Parameter Control Events work anywhere in a pattern. No macro change command has to be called before executing a Parameter Control Event. They do not need to be placed on a specific channel to work, although it is generally recommended to reserve some extra channels in your patterns that you only use for automating plugin parameters — it simply looks more tidy and organised.

Parameter Control Events are entered into the pattern the same way as normal note events, but they always occupy a whole pattern cell:

```
NoteIns Vol  Eff
PCs 03 141 592
PC  xx yyy zzz
```

- The note column indicates that this is a Parameter Control Event (instead of a normale Note Event). If there is no key assigned to Parameter Control Events in your keyboard map, you can also double-click the note column to open the Note Properties and change the note type to "PC" or "PCs". There are two possible values for this column:

  - **PC**: Absolute setting. The specified parameter value is directly set on the first tick of the row.
  - **PCs**: Smooth parameter change. The specified parameter value is interpolated over the course of a whole row from the previous parameter setting.
- The instrument column (**xx**) contains the plugin ID which can be obtained through the General Tab (in the Plugin section), from the Tree View or by right-clicking the pattern cell that holds the Parameter Control Event and choosing "Change Plugin".
- The volume column (**yyy**) contains the zero-based index of the parameter that should be controlled, in decimal notation. This, too, can be obtained from the General Tab (in the "Factory Preset" section) or by right-clicking the pattern cell that holds the Parameter Control Event and choosing "Change Plugin Parameter".
- The effect column (**zzz**) contains the parameter value, also in **decimal** notation. It ranges from 000 to 999.

Note that Parameter Control Events can be inserted into patterns automatically using the "Record Parameter Changes" option in the Plugin Window menu, or by setting up a MIDI Mapping.

You can use the Interpolate Effect command on a selection of Parameter Control events (any column). This will interpolate the parameter value (in the effect column) between the first and last event, replacing previous Parameter Control Event, filling in any blanks, and writing over note events.

You can delete the Parameter Control Event by entering a different note into the note column, or by pressing the delete shortcut key in the first column.

Known Issues

This chapter is devoted to addressing compatibility issues that OpenMPT has with certain plugins. The list is by no means complete, and it certainly is not our goal to compile a general list of buggy plugins. Keep in mind that there are many plugins out there that only work with a couple of plugin hosts (because the plugin author was lazy, did not conform to the VST "standard", only tested his plugin with one host, etc.). The best way to test if a plugin is buggy or just not compatible with OpenMPT is to load the plugin into a similar host (Renoise, Psycle, MadTracker, etc.) and check if they behave identically.

General

Plugins with hundreds of parameters

Plugins like Boris K.'s INTRO or Novaflash's Oxytocin have too many controls for use with MIDI macros. Macros can only be used to control the first 384 parameters.

Workaround: If you need to automate plugin parameters, use these plugins only in MPTM format and access the controllers with Parameter Control Events, in which the limit is 1000.

Plugins that make use of the full MIDI note range

Some instrument plugins, notably drum plugins such as Toontrack EZDrummer, make full use of the 128 MIDI note range, but OpenMPT cannot access the highest 8 notes, which has the side effect of not being able to play the highest octave of the instrument plugins.

Workaround: You can use MIDI macros to send arbitrary notes to plugins. For example, you could use the parametered macro `9c z v` to trigger any of the 128 MIDI notes and `9c z 0` to stop it.

Crackling and clicking plugins

With some plugins like Synful Orchestra and older versions of jBridge, semi-random clicks can be heard when using the plugin. This problem does also occour in other VST hosts that use a varying plugin buffer length.

Workaround: None. Notify the plugin authors of the problem.

Copy-protected plugins

Some plugins like SampleTank will only work if you run OpenMPT in administrator mode, most likely due to their copy protection.

Workaround: Do what you should never do - run OpenMPT in administrator mode.

Specific Plugins

Angular Momentum Freehand

This VST instrument will not render properly if any controls are modified with macros or Parameter Control Events during export, even though the track itself will play perfectly. The problem occurs only during rendering / exporting.

Workaround: None, except for recording from Windows audio during OpenMPT playback.

DSK plugins

Free and non-free DSK instruments seem to have several issues, not only in OpenMPT. Issues ranging from plugin exceptions to faulty processing on long notes have been reported.

Workaround: None, use other plugins.

E-MU EmulatorX / ProteusVX

These plugins seem to steal window messages from OpenMPT, so clicking the plugin editor's close button or any of OpenMPT's menus in the plugin editor has no effect.

Workaround: The plugin window can be closed using the "Edit" buttons on General / Pattern / Instrument Tabs.

Farbrausch V2

While the V2 can be automated through VST parameters, parameter changes are not made visible in the plugin GUI instantly. Likewise, OpenMPT does not get notified of parameter changes made through the plugin GUI, so recording parameter changes does also not work. Furthermore, the V2 is very unstable when being used together with other plugins (for example it might freeze the host when closing the module), or when loading multiple instances of V2. Those problems are true for all other hosts as well, due to the way V2 works.

Workaround: Only ever load one V2 instance (several instances of the plugin's "single" version will also work). If you want to use V2's sounds in songs together with other plugins, render its output to a Wave file from a separate module.

JS Plugin Series

All plugins from this rather old series share the same unique ID, so OpenMPT may confuse them every now and then.

Workaround: If the wrong plugin is loaded, remove all JS plugins from the Plugin Manager and add them again. If you do not *have* to use those plugins, avoid them.

Kontakt 2

Kontakt has many issues when being used from OpenMPT, including GUI, rendering, and "dropped" output over several notes. However, it seems like more recent versions of Kontakt behave more stable in OpenMPT, even without resorting to "host plugins" like Chainer.

Workaround: Use the latest version of Kontakt to avoid problems. Also, for rendering problems, set the "Slow Render" checkbox in the Wave Export dialog. Users have also suggested using Xlutop's Chainer VST for older versions, and loading Kontakt into one of its slots; Chainer will then process the VST instrument and send its output to OpenMPT.

NaiveLPF

This plugin is known to crash OpenMPT and other hosts.

Workaround: None. Use a different filter plugin.

Roland (Edirol) Orchestral

This VST does make use of the VST parameter mechanism, so plugin settings have to be adjusted using MIDI CCs. Furthermore, the performance data (plugin settings) is not saved, so re-opening a module using Orchestral will not recall the previous settings (This is a plugin issue, not an issue of OpenMPT).

Workaround: Uses MIDI messages to transmit controller data. Read the plugin's manual to see its Implementation Chart. In most cases you can Control-click on the target GUI control to see which MIDI CC# the control is accessed by, then assign the MIDI CC to a macro.

Unsorted

Compatible Playback

Why a compatible playback mode?

Playback accuracy has always been a problem with tracked music. While the tracker interface with its effect letters and such is simple and fast to use, the internal algorithms used to process effects are not always as simple as they might appear on-screen. For example, due to a little typo, an effect might behave erratically under certain conditions in its original tracker application.

More compatible playback of modules can be enabled in the Song Properties.
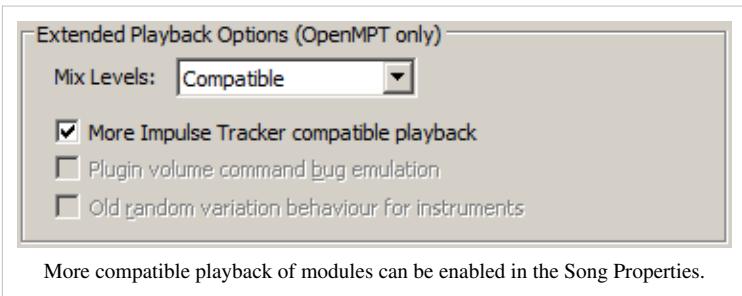
When another tracker (like OpenMPT) decides to support a certain third-party format (for example the XM format of Fasttracker 2), it should faithfully reproduce the meaning of every effect letter and all other behaviour. Sadly, this has not always been the case with (Open)MPT. In the past, users of other trackers have often complained that OpenMPT does not behave like other trackers and thus replays their music (that has been written in another tracker like Fasttracker 2) incorrectly.

Often, making OpenMPT "emulate" those original behaviours, or indeed "quirks", is the matter of changing a single line of code. However, the same feature that has previously been playing wrong in (Open)MPT may of course, after having fixed it, sound "wrong" in any modules composed with (Open)MPT that made use of this feature. Thus, the programmers of OpenMPT found it necessary to add a "Compatible Playback" option (to be found in the Song Properties) to switch between OpenMPT's and other tracker's behaviour. That way, people do not have to fear that their modules made with older versions of OpenMPT suddenly sound wrong after upgrading, and people who want to listen to their tunes made with another application can also happily listen to them without problems.

What should I do when composing a track in OpenMPT?

That depends on your intentions and goals. When using OpenMPT's own MPTM format, you do not need to care about compatibility settings. You do not need to enable any compatible playback mode. If you do, your track is not guaranteed to sound the same in upcoming OpenMPT versions.

However, if you are composing IT and XM modules, you most likely want to spread them on the internet and share them with friends. In that case, it is important to **enable** compatible playback, because many people are using other players (such as XMPlay, Schism Tracker, MilkyTracker or indeed Impulse Tracker and Fasttracker 2), and all of those try to "emulate" Impulse Tracker and Fasttracker 2 as precisely as possible - they do not want to emulate OpenMPT's own "quirks". Thus, if you compose a track in those formats, you are absolutely recommended to enable compatible playback - you do not want to get a bad review on your music because it sounds "totally horrible" in XMPlay, just because you forgot to turn on compatible playback, do you?

You should take Impulse Tracker (for IT files) or Fasttracker 2 (for XM files) as a reference when composing your tracks, or at least XMPlay (a very accurate player for both file formats) if you cannot get the original trackers to run. Upcoming OpenMPT updates will bring further improvements to the compatible playback mode, so if something in OpenMPT sounds different from Impulse Tracker / Fasttracker 2, do not hesitate to report it on our Issue Tracker [1]

and it will most likely sound correct in the next version of OpenMPT - when enabling compatible playback, that is.

It is advised to use Compatibility Export together with this feature.

Compatible Playback differences in IT files

Impulse Tracker's playback routine is relatively bug-free and logical, especially to the programmer. OpenMPT's IT playback is already relatively good even with compatible mode being disabled, however some small (and not-so-small) details are not handled correctly. Sometimes they can cause quite drastic differences in playback.

Please note that this table is not guaranteed to be complete.

	Default Handling	Compatibility Mode
Tempo Range	32 - 512 BPM.	Limited to 32 - 255 BPM.
Auto Vibrato	FT2's vibrato algorithm is used.	IT's vibrato algorithm is used.
Bidi loops	Last sample is repeated.	Last sample is not repeated.
Bidi loops and instrument numbers	Instrument numbers in the pattern reset the bidi loop direction to forwards.	Instrument numbers do not change bidi loop playback.
Random Volume Variation	Variation is a percentage of the note volume. Variation drifts off over time if notes are triggered without an instrument number. Variation has a limited dynamic range (±32).	Variation is a percentage of the sample's global volume and does not drift off over time. Full dynamic range (±64).
Random Panning Variation	Variation has a limited panning range (±64). Variation drifts off over time if notes are triggered without an instrument number.	Variation has full panning range (±256) and does not drift off to the left or to the right.
Tremolo	Not processed if sample volume is 0.	Always processed.
Portamento Memory	Volume column commands (exx and fxx) do not share memory with their effect column counterparts (Exx and Fxx).	Effect memory is shared.
Portamento	Compatible Gxx has no effect.	If Compatible Gxx is enabled, Gxx shares its effect memory with Exx / Fxx / exx / fxx.
Portamento without note	Portamento target is not cleared when the target note is reached, so the next portamento without a note slides to the previous pitch target.	Portamento target is cleared when the target note is reached.
Portamento after Note-Off	A note with a portamento always nullifies the key-off effect of a previously note	Key-off status is kept with portamento notes if "Compatible Gxx" is disabled or there is no instrument number.
Global Volume Slide Memory	Global parameter memory for W00.	Per-channel parameter memory for W00.
Pattern loop	Processed as in S3M files.	Processed as in MOD files. Loop count is not reset when jumping to a different pattern while still being in the loop.
Multi-Sample Instrument + Portamento	Notes next to portamento commands can change the sample of a multi-sample instrument.	Notes next to a portamento command cannot change the played sample of a multi-sample instrument.
Pitch / Pan Separation	When using a transposed sample map, the transposed note is used to determine the pan position.	The actual pattern note is used to determine the pan position.
Retrigger and Tremor	These effects behave in a non-standard manner.	These effects behaves the same as in Impulse Tracker.
Retrigger with short samples	Samples are always retriggered.	If a sample stops before it would be retriggered, it is not retriggered at all.
Panning Variation	Always applied.	Not applied if a panning command is encountered.

Envelope loop precedence	Normal loop is checked before sustain loop.	Sustain loop is checked before normal loop.
Set waveform effects (S3x – S5x)	Parameters greater than 3 are processed as in XM tracks.	Waveform commands default to the sine waveform if x is greater than 3.
NNA effects (S70 - S76)	NNA settings are recalled if there is an instrument entry in the pattern.	NNA settings are only recalled if there is a note entry.
Envelope effects (S77 – S7C)	Envelopes are disabled / enabled.	Envelopes are paused / resumed.
S6x pattern delay	Only the rightmost delay on a row is used.	Delay values on the same row are added up.
S8x panning	Does not reset surround mode.	Resets surround mode.
SAx + Note	SAx with a note applies the offset instantly.	SAx only affects upcoming Oxx commands.
SCx Note Cut	SCx mutes samples, so they can be picked up using volume commands.	SCx cuts samples like a normal note cut.
Offset beyond sample length	Unless IT old effects are enabled, Oxx parameters greater than the sample's length will play from the loop start.	Unless IT old effects are enabled, out-of-range offset are ignored.
Surround Panning	Panning variation, panbrello, panning envelopes always affect the rear channels.	These effects are only applied if Quad Surround (S9B) mode is enabled. Default sample and instrument panning disabled surround unless Quad Surround is enabled.
Random Panbrello / Vibrato / Tremolo Waveform	A look-up table is used for random values, so sounds the same on all channels.	Real random values are used.
Resonant Filter	Always using OpenMPT's custom filter coefficients	If Extended Filter Range is *disabled*, Impulse Tracker's filter efficients are used. Filter reproduction is very similar to IT / XMPlay.
Filter Cutoff Handling	Any cutoff value enables filtered output, but full cutoff disables the filter on the next note.	Filter is turned on if cutoff is not at maximum *or* resonance is not at minimum. Otherwise, it is turned off for the next note.

Compatible Playback differences in XM files

Fasttracker 2 has a **very quirky** playback routine which makes even common pattern effects (and combinations thereof) behave totally unpredictable. These idiosyncrasies are not handled very well (or not at all) when compatible playback is disabled, so you are **absolutely advised** to turn on compatible playback for XM Files. Many people listen to those files with MilkyTracker and XMPlay, and those two programs emulate Fasttracker 2's quirks rather well - and so does OpenMPT's compatible playback mode.

Please note that this table is not guaranteed to be complete.

	Default Handling	**Compatibility Mode**
Tempo Range	32 - 512 BPM.	Limited to 32 - 255 BPM.
Arpeggio (0xy)	Acts like in every other tracker.	Arpeggios are played backwards and show out-of-this-world behaviour at pattern speeds greater than 16.
Volume Column Memory	Slide commands have a parameter memory.	No memory, i.e. d00 does nothing.
Volume Column l00	Used as memory value.	Resets the panning to hard left on all but the first tick.
Volume Column uxx	Vibrato speed is set and vibrato is applied.	Only vibrato speed is set.
Pattern Loops	Do not affect next pattern.	Unless a pattern jump or pattern break command is encountered after the pattern loop, playback of the next pattern begins on the same row as the last E60 (pattern loop start) command. Pattern break commands that are located left of an E6x effect are "overwritten" with that parameter x.
Note Delays	Note delays (EDx) called without a note are ignored.	Note details without a note retrigger the last played note. Any effects next to a note delay may behave erratic in general.
Note Delay Range	Any note delay that does not exceed the row length (including pattern delays) is accepted.	Notes are ignored if their note delay is higher than the current speed (ignoring any pattern delays on the current row).
Note Delay + Tone Portamento	Tone Portamento is executed.	Tone Portamento is ignored.
Portamento Target Reset	Instrument numbers and notes with no portamento effect next to them reset the portamento target note.	Only notes that are next to a portamento effect set the portamento target note.
Instrument Change + Portamento	Instrument is changed.	Old instruments keeps playing and its settings (default volume etc.) are restored, portamento is applied.
Note Off + Instrument Number	Instrument number is ignored.	The instrument number recalls the *currently playing* instrument's default settings (including default volume).
Global Volume	Applied on all ticks.	Applied on all but first tick.
Global Volume Slide Memory	Global parameter memory for H00.	Per-channel parameter memory for H00.
Out-of-range Notes	Notes (including sample transpose) exceeding the 8 octave range are limited to that range.	Notes exceeding the 8 octave range are ignored.
Note + K00	Instant Note-Off is applied.	The note next to K00 is ignored, Note-Off is applied. Instrument fades out if volume envelope is not enabled.
Kxx behaviour	If no volume envelope is present, the sample is faded out.	If no volume envelope is present, the sample is cut. With K00, the sample is always faded out, even if no volume envelope is present.
Lxx behaviour	The playback position of both envelopes is set.	Only the volume envelope's position is set.
Retrigger (Rxy)	Normal behaviour.	Unpredictable behaviour especially when used together with volume commands in the same channel. In that case, every note is retriggered with the volume provided.
Tremor (Txy)	Returns to full volume after effect usage, parameter updates take effect immediately.	Parameters are updated when the previous on/off phase is finished. Phase is kept even if the next row does not contain a tremor effect.

Offset beyond sample length	9xx parameters greater than the sample's length will play from the end of the sample.	Out-of-range offset acts as note cut.
Pan Slides	Same as in IT files (four times faster than intended), no fine slides.	Pan slides are as fine as IT "fine" slides.
Fade behaviour	A faded out note cannot be picked up.	Faded instruments can be picked up using portamento if the sample is long enough.
Command X extensions	X5x, X6x, X7x, X9x, XAx are mapped to their IT equivalents S5x, S6x, S7x, S9x, SAx.	The listed commands are ignored.
Bidi loops and instrument numbers	Instrument numbers in the pattern reset the bidi loop direction to forwards.	Instrument numbers do not change bidi loop playback.

References

[1] http://bugs.openmpt.org/

Effect Reference

Here is a list of all effect commands that can be used in patterns. Commands that go into the volume column use a lowercase effect letter, while effects that go into the effect column use uppercase effect letters. The behaviour of some effect commands might be influced by the compatible playback option.

It should be noted that the MOD and XM formats share most of their similar commands, while S3M and IT (and IT-type) formats share a different set, even though they duplicate most of the MOD / XM functions and features.

Most effect commands do not affect instrument plugins currently; most of them only affect sample playback. Since this might change in the future, such effects should be avoided on channels that make use of instrument plugins.

An effect command consists of one character (the "effect letter") followed by the value that will be applied (the "parameter"), which is a hexadecimal number in the effect column and a decimal number in the volume column. If the notation is given as xx, this means the value is expecting a number between 00h and FFh, which is a decimal value of $0 - 255$. If the notation is xy, each digit is independent of the other, and each will be using a value between 0h and Fh ($0 - 15$). For example, for the Txx command, xx will be a value between 00h and FFh; so for a value of 98, convert the decimal value to hex (62h) and enter it in the fourth column (in the row it should apply) as T62. As another example, the Hxy command uses two values, x and y; so if x is 4 (vibrato speed) and y is 12 (vibrato depth), you enter the command as H4C.

If you do not feel comfortable with decimal $\leftrightarrow$ hexadecimal conversion, you can also double-click on an effect to open the Note Properties dialog. From there, you can adjust the effect parameters using sliders, and their exact meaning is shown as well.

Note that values are often limited by the command, such as the XM command Cxx, which limits the value to 40h (64).

Common Effect Parameters

Most effect parameter follow a simple scheme, but some effects also use a lookup table for their parameters. Depending on the effect, different parameters might do completely different things. Some common lookup table effects are described below.

Waveform Types

Some oscillator effects (namely Vibrato, Tremolo and Panbrello) use preset oscillator waveforms. They can be changed using special commands; the possible parameters of these commands are listed here:

Parameter	Waveform	Parameter	Waveform
0	Sine — retrigger (default)	4	Sine — continue
1	Saw — retrigger	5	Saw — continue
2	Square — retrigger	6	Square — continue
3	Random — retrigger	7	Random — continue

Retrigger means that the oscillator waveform is retriggered when a new note is played. **Continue** means that the waveform continues at its last playback position when a new note is played. In the S3M / IT / MPTM formats, only the first four parameters are available.

Retrigger Volume

The retrigger command (Rxy in XM files and Qxy in S3M / IT / MPTM files) does not only retrigger the note every y ticks, it also changes the sample volume, depending on the x value. The following table explains the meaning of every possible x parameter:

Parameter	Effect	Parameter	Effect
0	Previous parameter value (XM) No volume change (S3M / IT / MPTM)	8	No volume change
1	Volume - 1	9	Volume + 1
2	Volume - 2	A	Volume + 2
3	Volume - 4	B	Volume + 4
4	Volume - 8	C	Volume + 8
5	Volume - 16	D	Volume + 16
6	Volume × ⅔	E	Volume × 1.5
7	Volume × ½	F	Volume × 2

Sound Control

The sound control effect (S9x in the S3M / IT / MPTM format, X9x in the XM format) can be used to control various aspects of sound playback. Possible parameters are explained here.

Parameter	Name	Description
0	Surround Off	Turns off surround on this channel. This should only be used when using Quad Surround Panning. To keep compatibility with other trackers, a normal panning effect should be used in Center Surround mode (see below).
1	Surround On	Enables surround playback on this channel. When using stereo playback, the right channel of a sample is played with inversed phase (Pro Logic Surround). When using quad playback, the rear channels are used for playing this channel.
8	Reverb Off	Explicitly turns off Reverb on this channel.
9	Reverb On	Explicitly turns on Reverb on this channel. The reverb parameters from the Player Setup are used. There is no per-song configuration for reverb available, so it should not be used.
A	Center Surround	This is the default surround mode. A Surround On command will place the channel in the center of the rear channels and any panning command brings it back to the front channels. This is a **global** setting, i.e. it affects all channels.
B	Quad Surround	In this surround mode, panning commands can be used to pan in the rear channels. In this mode, switching between the front and rear channels can only be done by using the Surround On and Surround Off commands. This too is a **global** setting, i.e. it affects all channels.
C	Global Filters	This is the default filter mode, which is compatible with Impulse Tracker. When resonant filters are enabled with a Zxx effect, they will stay active until explicitly disabled — by setting the cutoff frequency to the maximum (Z7F), and the resonance to the minimum (Z80). This is a **per-channel** setting.
D	Local Filters	When this mode is selected, the resonant filter will only affect the current note and will revert when a new note is played. Again, this is a **per-channel** setting.
E	Play Forward	Forces the sample to play forward.
F	Play Backward	Forces the sample to play backward.

MOD Effect Commands

Effect Column

The following commands can be entered into the effect column. The MOD format does not make use of the volume column, so no commands can be used in the volume column. All parameter values are **hexadecimal**.

Effect	Name	Memory[†]	Description
0xy	Arpeggio	No	Plays an arpeggiation of three notes in one row, cycling between the current note, note + x semitones and note + y semitones. For example, 037 plays a minor chord, and 047 plays a major chord. 000 does nothing, i.e. this effect has no memory.
1xx	Portamento Up	No	Slides up the pitch of the current note, decreasing the playback period by xx on all ticks but the first. Thus, the Speed setting affects the amount of pitch change.
2xx	Portamento Down	No	Same as 1xx, but slides down the pitch of the current note.
3xx	Tone Portamento	Yes	Pitch-bends the previous note towards the current note at rate xx for the duration of the current row. The pitch is changed by xx periods on all ticks but the first, and is thus affected by the Speed.
4xy	Vibrato	Yes	Vibrato with speed x and depth y. This command oscillates the frequency of the current note with a sine wave (you can change the vibrato waveform by using the E4x command).
5xy	Volume Slide + Tone Portamento	No	Equivalent to volume slide (Axy) plus Tone Portamento (300). The xy parameter affects the volume slide thus works like the parameters of the Axy command. The tone portamento effect uses the last specified portamento speed from a 3xx command. The command 500 does not change the volume, i.e. it is equal to the command 300.

6xy	Volume Slide + Vibrato	No	Equivalent to volume slide (Axy) plus Vibrato (400). The xy parameter affects the volume slide thus works like the parameters of the Axy command. The vibrato effect uses the last specified vibrato parameters from a 4xy command. The command 600 does not change the volume, i.e. it is equal to the command 400.
7xy	Tremolo	Yes	Tremolo with speed x and depth y. This command oscillates the sample volume with a sine wave (you can change the tremolo waveform by using the E7x command).
8xx	Set Panning	—	Sets the pan position of the current channel. The value ranges from 00h (left) to FFh (right).
9xx	Sample Offset	Yes	Starts playing the sample at the position xx × 256 (instead of position 0). This effect does not do anything if there is no note in the same pattern cell.
A0x	Volume Slide Down	No	Decreases the sample volume by x on all ticks but the first if x is not 0. So if the current speed is 6 (6 ticks per row), A0x decreases the volume by x × 5.
Ax0	Volume Slide Up	No	Same as A0x, but increases the volume. The maximum volume is 64 (40h).
Bxx	Position Jump	—	Causes the playback to jump to the pattern position xx, where xx is a number between 0 and 127 (MOD files have a maximum number of 128 patterns). As an example, B00 will restart the song from the beginning. If used together with a pattern break (Dxx), you can also specify the starting row (by default, it will play from the first row).
Cxx	Set Volume	—	Sets the sample volume to xx, where xx must be between 00h (silence) and 40h (full volume).
Dxx	Pattern Break	—	Jumps to row xx of the next pattern in the Order List. As patterns have a fixed length of 64 rows in the MOD format, xx can only range from 00h to 40h. If the current pattern is the last pattern in the Order List, this command will go to the row xx of the first pattern. When combined with the Bxx effect, you can also jump into other patterns than the next pattern.
E1x	Fine Portamento Up	No	Same as 1xx, but is only applied on the first tick of the row.
E2x	Fine Portamento Down	No	Same as 2xx, but is only applied on the first tick of the row.
E3x	Glissando Control	—	E30 disables glissando, E31 enables glissando. When glissando is active, tone portamento effects will slide by semitones (like a guitar).
E4x	Set Vibrato Waveform	—	Sets the waveform of succeeding Vibrato effects. See the waveform table for the exact meaning of the parameter.
E5x	Set Finetune	—	Overrides the current sample's finetune value. The parameter is equivalent to the same setting in the sample editor.
E60	Pattern Loop Start	—	Marks the start of a pattern loop.
E6x	Pattern Loop	—	When this effect is reached, playback is resumed at the loop start that was set with the E60 command on this channel, x times in total. Pattern loops cannot span several patterns, so if there was no E60 command on the same pattern on a previous row, playback is restarted on the first row of the pattern.
E7x	Tremolo Waveform	—	Sets the waveform of succeeding Tremolo effects. See the waveform table for the exact meaning of the parameter.
E8x	Set Panning	—	Sets the pan position of the current channel. The value ranges from 0h (left) to Fh (right). As this is very coarse, it is recommened to use the 8xx effect instead.
E9x	Retrigger	No	Retriggers the current note every x ticks. This effect also works with parameters greater than the current speed setting if the next row also contains an E9x effect.
EAx	Fine Volume Slide Up	No	Same as Ax0, but is only applied on the first tick of the row.
EBx	Fine Volume Slide Down	No	Same as A0x, but is only applied on the first tick of the row.
ECx	Note Cut	—	Sets the sample volume to 0 after x ticks, if x is less than the current speed.
EDx	Note Delay	—	Delays the note or instrument change in the same pattern cell by x ticks, if x is less than the current speed.

EEx	Pattern Delay	—	Repeats the current row x times. Notes are not retriggered each time the row is repeated, but effects are still being processed. If several pattern delays are found on the same row, only the leftmost command is considered.
EFx	Invert Loop	—	When used with a looped sample, this command goes through the sample loop and inverts all sampling points (i.e. it changes the sign) one by one at speed x. The effect is applied until EF0 is called. This is the only command which actually **modifies the module file during playback**. Samples mangled by this effect cannot be recovered automatically, i.e. no undo point is created.
Fxx	Set Speed / Tempo	—	Sets the speed (ticks per row) if xx ≤ 20h or tempo if xx > 20h. Avoid using exactly 20h as a parameter, since some players interpret that as "Set Tempo" as well. Also avoid using 00h as a parameter. It does nothing in OpenMPT, but some players stop the song if they encounter an F00 effect.

† **Effect Memory**:

- **No** means that this effect does nothing if the effect parameter is 00h.
- **Yes** means that this effect has an own parameter memory. If the effect is called with the parameter 00h, the previous effect parameter on this channel is recalled. For example, if the effect 482 is followed by the effect 400 on a subsequent row, the 400 effect recalls the effect parameter 82h.
- **—** means that the effect parameter 00h has no special meaning. For example C00 mutes the channel, B00 jumps to the first pattern, and so on.

XM Effect Commands

The XM format uses an extended version of the MOD command set. As Fasttracker 2 was a rather buggy program, many effect commands may behave in a quirky way. Always enable more FT2 compatible playback for the best possible emulation of those quirks.

Effect Column

The following commands can be entered into the effect column. All parameter values are **hexadecimal**.

Effect	Name	Memory†	Description
0xy	Arpeggio	No	Plays an arpeggiation of three notes in one row, cycling between the current note, note + x semitones and note + y semitones. For example, 037 plays a minor chord, and 047 plays a major chord. 000 does nothing, i.e. this effect has no memory.
1xx	Portamento Up	Yes	Slides up the pitch of the current note, decreasing the playback period by xx on all ticks but the first. Thus, the Speed setting affects the amount of pitch change. If linear frequency slides are enabled, one unit of this effect equals $\frac{1}{16}$th of a note (this applies to **all** pitch-bending effects). 1xx shares effect memory with 2xx.
2xx	Portamento Down	Yes	Same as 1xx, but slides down the pitch of the current note.
3xx	Tone Portamento	Yes	Pitch-bends the previous note towards the current note at rate xx for the duration of the current row. The pitch is changed by xx periods on all ticks but the first, and is thus affected by the Speed.
4xy	Vibrato	Yes	Vibrato with speed x and depth y. This command oscillates the frequency of the current note with a sine wave (you can change the vibrato waveform by using the E4x command).
5xy	Volume Slide + Tone Portamento	Yes	Equivalent to volume slide (Axy) plus Tone Portamento (300). The xy parameter affects the volume slide thus works like the parameters of the Axy command. The tone portamento effect uses the last specified portamento speed from a 3xx command.
6xy	Volume Slide + Vibrato	Yes	Equivalent to volume slide (Axy) plus Vibrato (400). The xy parameter affects the volume slide thus works like the parameters of the Axy command. The vibrato effect uses the last specified vibrato parameters from a 4xy command.
7xy	Tremolo	Yes	Tremolo with speed x and depth y. This command oscillates the sample volume with a sine wave (you can change the tremolo waveform by using the E7x command).

8xx	Set Panning	—	Sets the pan position of the current channel. The value ranges from 00h (left) to FFh (right). As every sample has an enforced default panning, this setting is reset with every subsequent instrument number.
9xx	Sample Offset	Yes	Starts playing the sample at the position xx × 256 (instead of position 0). This effect does not do anything if there is no note in the same pattern cell.
A0x	Volume Slide Down	Yes	Decreases the sample volume by x on all ticks but the first. So if the current speed is 6 (6 ticks per row), A0x decreases the volume by x × 5.
Ax0	Volume Slide Up	Yes	Same as A0x, but increases the volume. The maximum volume is 64 (40h).
Bxx	Position Jump	—	Causes the playback to jump to the pattern position xx, where xx is a number between 0 and 127 (MOD files have a maximum number of 128 patterns). As an example, B00 will restart the song from the beginning. If used together with a pattern break (Dxx) that is located **right** of the Bxx effect, you can also specify the starting row (by default, it will play from the first row).
Cxx	Set Volume	—	Sets the sample volume to xx, where xx must be between 00h (silence) and 40h (full volume).
Dxx	Pattern Break	—	Jumps to row xx of the next pattern in the Order List. If xx is higher than the next pattern's length, the first row is used as a jump target. If the current pattern is the last pattern in the Order List, this command will go to the row xx of the first pattern. When combined with the Bxx effect, you can also jump into other patterns than the next pattern. Note that if there is a Bxx effect **right** of the Dxx effect, the Dxx effect is **ignored**.
E1x	Fine Portamento Up	Yes	Same as 1xx, but is only applied on the first tick of the row.
E2x	Fine Portamento Down	Yes	Same as 2xx, but is only applied on the first tick of the row.
E3x	Glissando Control	—	E30 disables glissando, E31 enables glissando. When glissando is active, tone portamento effects will slide by semitones (like a guitar).
E4x	Set Vibrato Waveform	—	Sets the waveform of succeeding Vibrato effects. See the waveform table for the exact meaning of the parameter.
E5x	Set Finetune	—	Overrides the current sample's finetune value. The parameter is equivalent to the same setting in the sample editor. E5x is only evaluated when found next to a note.
E60	Pattern Loop Start	—	Marks the start of a pattern loop. **Note**: One of the most infamous Fasttracker 2 bugs concern the handling of this command: When E60 is used on pattern row x, the following pattern also starts from row x instead of the beginning of the pattern. This can be avoided by placing a D00 effect on the last row of the pattern in which E60 was used.
E6x	Pattern Loop	—	When this effect is reached, playback is resumed at the loop start that was set with the E60 command on this channel, x times in total. Pattern loops cannot span several patterns, so if there was no E60 command on the same pattern on a previous row, playback is restarted on the first row of the pattern.
E7x	Tremolo Waveform	—	Sets the waveform of succeeding Tremolo effects. See the waveform table for the exact meaning of the parameter.
E8x	Set Panning	—	Sets the pan position of the current channel. The value ranges from 0h (left) to Fh (right). As this is very coarse, it is recommened to use the 8xx effect instead. As with 8xx, any instrument number resets the effect of this command.
E9x	Retrigger	No	Retriggers the current note every x ticks. This effect also works with parameters greater than the current speed setting if the next row also contains an E9x effect.
EAx	Fine Volume Slide Up	Yes	Same as Ax0, but is only applied on the first tick of the row.
EBx	Fine Volume Slide Down	Yes	Same as A0x, but is only applied on the first tick of the row.
ECx	Note Cut	—	Sets the sample volume to 0 after x ticks, if x is less than the current speed.

EDx	Note Delay	—	Delays the note or instrument change in the same pattern cell by x ticks, if x is less than the current speed.. **This command is very buggy**. Several anomalies of the original Fasttracker 2 behaviour are not emulated fully. Some emulated anomalies are: EDx with no note in the same pattern cell retriggers the last played note, and portamento effects next to a note delay are ignored.
EEx	Pattern Delay	—	Repeats the current row x times. Notes are not retriggered each time the row is repeated, but effects are still being processed. If several pattern delays are found on the same row, only the rightmost command is considered.
EFx	Set Active Macro	—	Selects the active parametered macro for this channel. Not an original command from Fasttracker 2.
Fxx	Set Speed / Tempo	—	Sets the speed (ticks per row) if xx < 20h or tempo if xx ≥ 20h. Avoid using 00h as a parameter. It does nothing in OpenMPT, but Fasttracker 2 and some other players stop the song if they encounter an F00 effect.
Gxx	Set Global Volume	—	Sets the global (master) volume. xx must be a value between 00h (no audio output) and 40h (full volume).
H0x	Global Volume Slide Down	Yes	Much like the A0x effect, this decreases the global volume by x on all ticks but the first. So if the current speed is 6 (6 ticks per row), H0x decreases the global volume by x × 5.
Hx0	Global Volume Slide Up	Yes	Same as H0x, but increased the global volume.
Kxx	Key Off	—	Triggers a Note Off command after xx ticks. Avoid using K00 as this interferes with other entries in the same pattern cell (e.g. a note or instrument entry).
Lxx	Envelope Position	—	Sets the volume envelope position to xx ticks. If compatible playback is deactivated, the panning envelope position is also updated, but this behaviour differs from Fasttracker 2.
P0x	Panning Slide Left	Yes	Slides the panning position to the left xx units. This effect is only applied on the first tick in compatible mode, and on all ticks but the first in non-compatible mode.
Px0	Panning Slide Right	Yes	Like P0x, but slides to the right.
Rxy	Retrigger	Yes	Retriggers the note every y ticks and changes the volume based on the x value according to the retrigger volume change table above. Note that this command is also **very buggy**. For example, if there is a volume command in the same pattern cell, the retrigger command will skip some ticks.
Txy	Tremor	Yes	Rapidly turns the sample volume on and off. The sample is played for x ticks and then muted for y ticks.
X1x	Extra Fine Porta Up	Yes	Applies an portamento slide on the first tick that is four times finer than normal slides. If linear frequency slides are enabled, this means that you can slide with a precision of $\frac{1}{64}$th of a note.
X2x	Extra Fine Porta Down	Yes	Same as X1x, but slides the frequency downwards.
X5x	Panbrello Waveform	—	Sets the waveform of succeeding Panbrello effects. See the waveform table for the exact meaning of the parameter. This is not an original Fasttracker 2 effect.
X5x	Panbrello Waveform	—	Sets the waveform of succeeding Panbrello effects. See the waveform table for the exact meaning of the parameter. This is not an original Fasttracker 2 effect.
X6x	Fine Pattern Delay	—	Extends the current row by x ticks. If several fine pattern delay commands are found on the same row, they are added up. This is not an original Fasttracker 2 effect.
X9x	Sound Control	—	Executes a sound control command, as described in the Sound Control table above. This is not an original Fasttracker 2 effect.
XAx	High Offset	—	Sets the high offset for subsequent offset (9xx) commands. x * 65536 (or 10000h) is added to all offset effects that follow this command. This is not an original Fasttracker 2 effect.
Yxy	Panbrello	Yes	Panbrello with speed x and depth y. This command oscillates the panning of the current note with a sine wave (you can change the vibrato waveform by using the X5x command). This is not an original Fasttracker 2 effect.
Zxx	MIDI Macro	—	Executes a MIDI Macro. This is not an original Fasttracker 2 effect.

\xx	Smooth MIDI Macro	—	Executes an interpolated MIDI Macro. This is not an original Fasttracker 2 effect.

† **Effect Memory**:

- **No** means that this effect does nothing if the effect parameter is 00h.
- **Yes** means that this effect has an own parameter memory. If the effect is called with the parameter 00h, the previous effect parameter on this channel is recalled. For example, if the effect 482 is followed by the effect 400 on a subsequent row, the 400 effect recalls the effect parameter 82h. Sometimes, parameter memory is shared between similar effects. If two effects share the same effect letter (e.g. A0x and Ax0), they generally use the same memory as well.
- **—** means that the effect parameter 00h has no special meaning. For example C00 mutes the channel, B00 jumps to the first pattern, and so on.

Volume Column

The following commands can be entered into the volume column. The only effect in this list that has an effect memory is "Vibrato Depth". Volume Slides etc. have no memory. All parameter values are **decimal**.

Effect	Name	Description
axx	Fine Volume Slide Up	Just like EAx, this slides the volume up x units on the first tick.
bxx	Fine Volume Slide Down	Just like EBx, this slides the volume down x units on the first tick.
cxx	Volume Slide Up	Just like Ax0, this slides the volume up x units on all ticks but the first.
dxx	Volume Slide Down	Just like A0x, this slides the volume down x units on all ticks but the first.
gxx	Tone Portamento	Just like 3xx, this pitch-bends from the previous note to the current note. Compared to Gxx, parameters are sixteen times more coarse, i.e. g1 equals G10. This effect does nothing when combined with note delay. Combining the effect with 3xx will double the effect parameter (e.g. g01 would act like g02) and ignores the 3xx command.
hxx	Vibrato Depth	Sets the vibrato depth to x and executes a vibrato (like the 4xy command).
lxx	Panning Slide Left	Like P0x, this slides the panning left by x units.
pxx	Set Panning	Set the panning to x, where x ranges from 0 to 64 (decimal). Note that this value is actually 4-Bit (with 16 distinct values), so when saving the file, fine panning changes using this command will be lost.
rxx	Panning Slide Right	Like Px0, this slides the panning right by x units.
uxx	Vibrato Speed	Sets the vibrato speed to x, but does not execute a vibrato.
vxx	Set Volume	Sets the sample volume to x. This command is also sent to instrument plugins.

S3M Effect Commands

Scream Tracker's S3M format uses a command set that is entirely different from the MOD and XM command set. It was the first of the supported trackers to have a volume column, thus its use is quite limited.

The format was soon extended by other programs and players to support more effect commands (e.g. 7-Bit panning, panning slides, channel volume, etc.) — ModPlug supports those extensions, and most of them are marked as such in the effect table below.

Effect Column

The following commands can be entered into the effect column. All parameter values are **hexadecimal**.

Effect	Name	Memory†	Description
Axx	Set Speed	—	Sets the speed (ticks per row). A00 does nothing.
Bxx	Position Jump	—	Causes the playback to jump to the pattern position xx. As an example, B00 will restart the song from the beginning. If used together with a pattern break (Cxx), you can also specify the starting row (by default, it will play from the first row).
Cxx	Pattern Break	—	Jumps to row xx of the next pattern in the Order List. As patterns have a fixed length of 64 rows in the S3M format, xx can only range from 00h to 40h, higher values are ignored. If the current pattern is the last pattern in the Order List, this command will go to the row xx of the first pattern. When combined with the Bxx effect, you can also jump into other patterns than the next pattern.
D0x	Volume Slide Down	Non-Zero	Decreases the sample volume by x on all ticks but the first if x is not 0. So if the current speed is 6 (6 ticks per row), D0x decreases the volume by x × 5. If Fast Volume Slides are enabled, the slide is executed on *every* tick of the row.
Dx0	Volume Slide Up	Non-Zero	Same as D0x, but increases the volume. The maximum volume is 64 (40h).
DFx	Fine Volume Slide Down	Non-Zero	Same as D0x, but is only applied on the first tick of the row. x may not be Fh.
DxF	Fine Volume Slide Up	Non-Zero	Same as Dx0, but is only applied on the first tick of the row. x may not be Fh.
Exx	Portamento Down	Non-Zero	Slides up the pitch of the current note, decreasing the playback period by xx on all ticks but the first. Thus, the Speed setting affects the amount of pitch change.
EFx	Fine Portamento Down	Non-Zero	Same as Exx, but is only applied on the first tick of the row.
EEx	Extra Fine Portamento Down	Non-Zero	Same as EFx, but the frequency change is four times as precise.
Fxx	Portamento Up	Non-Zero	Same as Exx, but slides up the pitch of the current note.
FFx	Fine Portamento Up	Non-Zero	Same as EFx, but slides up the pitch of the current note.
FEx	Extra Fine Portamento Up	Non-Zero	Same as EEx, but slides up the pitch of the current note.
Gxx	Tone Portamento	Yes	Pitch-bends the previous note towards the current note at rate xx for the duration of the current row. The pitch is changed by xx periods on all ticks but the first, and is thus affected by the Speed. Note that there are no fine or extra fine tone portamento parameters.
Hxy	Vibrato	Yes	Vibrato with speed x and depth y. This command oscillates the frequency of the current note with a sine wave (you can change the vibrato waveform by using the S3x command). This effect shares effect memory with Uxy (Fine Vibrato).
Ixy	Tremor	Non-Zero	Rapidly turns the sample volume on and off. The sample is played for x ticks and then muted for y ticks.

Jxy	Arpeggio	Non-Zero	Plays an arpeggiation of three notes in one row, cycling between the current note, note + x semitones and note + y semitones. For example, J37 plays a minor chord, and J47 plays a major chord.
Kxy	Volume Slide + Vibrato	Non-Zero	Equivalent to volume slide (Dxy) plus Vibrato (H00). The xy parameter affects the volume slide thus works like the parameters of the Dxy command. The vibrato effect uses the last specified vibrato parameters from a Hxy command.
Lxy	Volume Slide + Tone Portamento	Non-Zero	Equivalent to volume slide (Dxy) plus Tone Portamento (G00). The xy parameter affects the volume slide thus works like the parameters of the Dxy command. The tone portamento effect uses the last specified portamento speed from a Gxx command.
Mxx	Set Channel Volume	—	Sets the channel volume, with which all sample volumes are multiplied. xx can range from 00h (silence) to 40h (full amplification). This effect is actally not supported by the original Scream Tracker 3, but was added early by other trackers / players and has since been adopted by many S3M players.
Nxy	Channel Volume Slide	Yes	This command's parameters works exactly like the Dxy parameters, with the difference that it affects the channel volume rather than the sample volume. Again, this command is not supported by Scream Tracker 3, but by a variety of other trackers and players.
Oxx	Sample Offset	Yes	Starts playing the sample at the position xx × 256 (instead of position 0). This effect does not do anything if there is no note in the same pattern cell.
P0x	Panning Slide Right	Yes	Slides the panning position to the left xx units on all ticks but the first if x is not 0. So if the current speed is 6 (6 ticks per row), P0x slides to the right by x × 5 units. Panning ranges from 0 to 64. This command is also not supported by Scream Tracker 3, but by a variety of other trackers and players.
Px0	Panning Slide Left	Yes	Same as P0x, but slides the panning position to the right.
PFx	Fine Panning Slide Right	Yes	Same as P0x, but is only applied on the first tick of the row. x may not be Fh.
PxF	Fine Panning Slide Left	Yes	Same as Px0, but is only applied on the first tick of the row. x may not be Fh.
Qxy	Retrigger	Non-Zero	Retriggers the note every y ticks and changes the volume based on the x value according to the retrigger volume change table above.
Rxy	Tremolo	Non-Zero	Tremolo with speed x and depth y. This command oscillates the sample volume with a sine wave (you can change the tremolo waveform by using the S4x command).
S00	Special Commands	Non-Zero	If an S command is called with parameter 00h, the last effect parameter on this channel is recalled and one of the commands below is executed, according to the previous effect parameter.
S1x	Glissando Control	—	S10 disables glissando, S11 enables glissando. When glissando is active, tone portamento effects will slide by semitones (like a guitar).
S2x	Set Finetune	—	Legacy command that overrides the current sample's C-5 frequency by applying a MOD finetune value.
S3x	Set Vibrato Waveform	—	Sets the waveform of succeeding Vibrato effects. See the waveform table for the exact meaning of the parameter. Note that only parameters 0 to 3 are accepted, i.e. only "retrigger" waveforms but not "continue" waveforms are allowed.
S4x	Tremolo Waveform	—	Sets the waveform of succeeding Tremolo effects. See the waveform table for the exact meaning of the parameter. Note that only parameters 0 to 3 are accepted, i.e. only "retrigger" waveforms but not "continue" waveforms are allowed.
S5x	Panbrello Waveform	—	Sets the waveform of succeeding Panbrello effects. See the waveform table for the exact meaning of the parameter. Note that only parameters 0 to 3 are accepted, i.e. only "retrigger" waveforms but not "continue" waveforms are allowed. This is not an original Scream Tracker 3 effect.
S6x	Fine Pattern Delay	—	Extends the current row by x ticks. If several fine pattern delay commands are found on the same row, they are added up. This command is also not supported by Scream Tracker 3, but by a variety of other trackers and players.
S8x	Set Panning	—	Sets the pan position of the current channel. The value ranges from 0h (left) to Fh (right). As this is very coarse, it is recommened to use the 8xx effect instead. As with 8xx, any instrument number resets the effect of this command.

S9x	Sound Control	—	Executes a sound control command, as described in the Sound Control table above. This is not an original Scream Tracker 3 effect. To enable surround, the XA4 command should be preferred over S91.
SAx	High Offset	—	Sets the high offset for subsequent offset (9xx) commands. x * 65536 (or 10000h) is added to all offset effects that follow this command. This is not an original Scream Tracker 3 effect.
SB0	Pattern Loop Start	—	Marks the start of a pattern loop.
SBx	Pattern Loop	—	When this effect is reached, playback is resumed at the loop start that was set with an SB0 (which does *not* need to be on the same channel as the loop end command), x times in total. Pattern loops cannot span several patterns, so if there was no SB0 command on the same pattern, playback is restarted on the first row of the pattern.
SCx	Note Cut	—	Stops the sample after x ticks, if x is greater than 0 and less than the current speed.
SDx	Note Delay	—	Delays the note or instrument change in the same pattern cell by x ticks. If x is 0, greater than or equal the current speed, the content of this cell is never played.
SEx	Pattern Delay	—	Repeats the current row x times. Notes are not retriggered each time the row is repeated, but effects are still being processed. If several pattern delays are found on the same row, only the leftmost command is considered.
T0x	Decrease Tempo	Yes	Slides the tempo down by x BPM on all ticks but the first. Use T00 to recall the last slide parameter.
T1x	Increase Tempo	Yes	Slides the tempo up by x BPM on all ticks but the first. Use T00 to recall the last slide parameter.
Txx	Set Tempo	—	Sets the tempo if xx ≥ 20h.
Uxy	Fine Vibrato	Yes	Fine Vibrato with speed x and depth y. This command works like Hxy, but the vibrato depth is four times finer. This effect shares effect memory with Hxy (Vibrato).
Vxx	Set Global Volume	—	Sets the global (master) volume. xx must be a value between 00h (no audio output) and 40h (full volume).
Wxy	Global Volume Slide	Yes	This command's parameters works exactly like the Dxy parameters, with the difference that it affects the global volume rather than the sample volume. This command is also not supported by Scream Tracker 3, but by a variety of other trackers and players.
XA4	Surround	—	Enables surround playback on this channel. When using stereo playback, the right channel of a sample is played with inversed phase (Pro Logic Surround). When using quad playback, the rear channels are used for playing this channel. Surround mode can be disabled by executing a different panning command on the same channel.
Xxx	Set Panning	—	Sets the pan position of the current channel. The value ranges from 00h (left) to 80h (right).
Yxy	Panbrello	Yes	Panbrello with speed x and depth y. This command oscillates the panning of the current note with a sine wave (you can change the vibrato waveform by using the X5x command). This is not an original Scream Tracker 3 effect.
Zxx	MIDI Macro	—	Executes a MIDI Macro. This is not an original Scream Tracker 3 effect, and since MIDI Macros are not stored in S3M files, only the default macro configuration can be used to control the resonant filter.

[†] **Effect Memory**:

- **No** means that this effect does nothing if the effect parameter is 00h.
- **Yes** means that this effect has a parameter memory. If the effect is called with the parameter 00h, the previous effect parameter on this channel is recalled. For example, if the effect H82 is followed by the effect H00 on a subsequent row, the H00 effect recalls the effect parameter 82h. Sometimes, parameter memory is shared between similar effects. If two effects share the same effect letter (e.g. N0x and Nx0), they generally use the same memory as well.
- **Non-Zero** means that this effect uses the last non-zero effect parameter in this column as memory, no matter which command it was assigned to. For example if A02 is followed by E00 on a subsequent row, the E00 recalls the effect parameter 02h.

- **—** means that the effect parameter 00h has no special meaning. For example X00 sets the panning position to full left, B00 jumps to the first pattern, and so on.

Volume Column

The following commands can be entered into the volume column. None of them have an effect memory. All parameter values are **decimal**.

Effect	Name	Description
pxx	Set Panning	Set the panning to x, where x ranges from 0 to 64 (decimal). This is not an original Scream Tracker 3 effect.
vxx	Set Volume	Sets the sample volume to x. This command is also sent to instrument plugins.

IT Effect Commands

Impulse Tracker's command set is based on the S3M command set; it adds some more commands and makes better use of effect memory.

Effect Column

The following commands can be entered into the effect column. All parameter values are **hexadecimal**.

Effect	Name	Memory[†]	Description
Axx	Set Speed	—	Sets the speed (ticks per row). A00 does nothing.
Bxx	Position Jump	—	Causes the playback to jump to the pattern position xx. As an example, B00 will restart the song from the beginning. If used together with a pattern break (Cxx), you can also specify the starting row (by default, it will play from the first row).
Cxx	Pattern Break	—	Jumps to row xx of the next pattern in the Order List. If xx is higher than the next pattern's length, the first row is used as a jump target. If the current pattern is the last pattern in the Order List, this command will go to the row xx of the first pattern. When combined with the Bxx effect, you can also jump into other patterns than the next pattern.
D0x	Volume Slide Down	Yes	Decreases the sample volume by x on all ticks but the first if x is not 0. So if the current speed is 6 (6 ticks per row), D0x decreases the volume by x × 5. If Fast Volume Slides are enabled, the slide is executed on *every* tick of the row. Effect memory is shared with volume column commands a, b, c and d.
Dx0	Volume Slide Up	Yes	Same as D0x, but increases the volume. The maximum volume is 64 (40h).
DFx	Fine Volume Slide Down	Yes	Same as D0x, but is only applied on the first tick of the row. x may not be Fh.
DxF	Fine Volume Slide Up	Yes	Same as Dx0, but is only applied on the first tick of the row. x may not be Fh.
Exx	Portamento Down	Yes	Slides up the pitch of the current note, decreasing the playback period by xx on all ticks but the first. Thus, the Speed setting affects the amount of pitch change. This effect shares effect memory with Fxx, exx and fxx. If Compatible Gxx is disabled, it also shares effect memory with Gxx and gxx. If linear frequency slides are enabled, one unit of this effect equals $\frac{1}{16}$th of a note (this applies to **all** pitch-bending effects).
EFx	Fine Portamento Down	Yes	Same as Exx, but is only applied on the first tick of the row.
EEx	Extra Fine Portamento Down	Yes	Same as EFx, but the frequency change is four times as precise, so if linear frequency slides are enabled, one unit of this effect equals $\frac{1}{64}$th of a note.
Fxx	Portamento Up	Yes	Same as Exx, but slides up the pitch of the current note.

FFx	Fine Portamento Up	Yes	Same as EFx, but slides up the pitch of the current note.
FEx	Extra Fine Portamento Up	Yes	Same as EEx, but slides up the pitch of the current note.
Gxx	Tone Portamento	Yes	Pitch-bends the previous note towards the current note at rate xx for the duration of the current row. The pitch is changed by xx periods on all ticks but the first, and is thus affected by the Speed. Note that there are no fine or extra fine tone portamento parameters. See Exx for more details on effect memory and effect precision.
Hxy	Vibrato	Yes	Vibrato with speed x and depth y. This command oscillates the frequency of the current note with a sine wave (you can change the vibrato waveform by using the S3x command). This effect shares effect memory with Uxy (Fine Vibrato).
Ixy	Tremor	Yes	Rapidly turns the sample volume on and off. The sample is played for x ticks and then muted for y ticks.
Jxy	Arpeggio	Yes	Plays an arpeggiation of three notes in one row, cycling between the current note, note + x semitones and note + y semitones. For example, J37 plays a minor chord, and J47 plays a major chord.
Kxy	Volume Slide + Vibrato	Yes	Equivalent to volume slide (Dxy) plus Vibrato (H00). The xy parameter affects the volume slide thus works like the parameters of the Dxy command. The vibrato effect uses the last specified vibrato parameters from a Hxy command.
Lxy	Volume Slide + Tone Portamento	Yes	Equivalent to volume slide (Dxy) plus Tone Portamento (G00). The xy parameter affects the volume slide thus works like the parameters of the Dxy command. The tone portamento effect uses the last specified portamento speed from a Gxx command.
Mxx	Set Channel Volume	—	Sets the channel volume, with which all sample volumes are multiplied. xx can range from 00h (silence) to 40h (full amplification).
Nxy	Channel Volume Slide	Yes	This command's parameters works exactly like the Dxy parameters, with the difference that it affects the channel volume rather than the sample volume.
Oxx	Sample Offset	Yes	Starts playing the sample at the position xx × 256 (instead of position 0). This effect does not do anything if there is no note in the same pattern cell.
P0x	Panning Slide Right	Yes	Slides the panning position to the left xx units on all ticks but the first if x is not 0. So if the current speed is 6 (6 ticks per row), P0x slides to the right by x × 5 units. Panning ranges from 0 to 64.
Px0	Panning Slide Left	Yes	Same as P0x, but slides the panning position to the right.
PFx	Fine Panning Slide Right	Yes	Same as P0x, but is only applied on the first tick of the row. x may not be Fh.
PxF	Fine Panning Slide Left	Yes	Same as Px0, but is only applied on the first tick of the row. x may not be Fh.
Qxy	Retrigger	Yes	Retriggers the note every y ticks and changes the volume based on the x value according to the retrigger volume change table above.
Rxy	Tremolo	Yes	Tremolo with speed x and depth y. This command oscillates the sample volume with a sine wave (you can change the tremolo waveform by using the S4x command).
S00	Special Commands	Yes	If an S command is called with parameter 00h, the last Sxy effect executed on this channel is repeated.
S1x	Glissando Control	—	S10 disables glissando, S11 enables glissando. When glissando is active, tone portamento effects will slide by semitones (like a guitar).
S3x	Set Vibrato Waveform	—	Sets the waveform of succeeding Vibrato effects. See the waveform table for the exact meaning of the parameter. Note that only parameters 0 to 3 are accepted, i.e. only "retrigger" waveforms but not "continue" waveforms are allowed.
S4x	Tremolo Waveform	—	Sets the waveform of succeeding Tremolo effects. See the waveform table for the exact meaning of the parameter. Note that only parameters 0 to 3 are accepted, i.e. only "retrigger" waveforms but not "continue" waveforms are allowed.

S5x	Panbrello Waveform	—	Sets the waveform of succeeding Panbrello effects. See the waveform table for the exact meaning of the parameter. Note that only parameters 0 to 3 are accepted, i.e. only "retrigger" waveforms but not "continue" waveforms are allowed.
S6x	Fine Pattern Delay	—	Extends the current row by x ticks. If several fine pattern delay commands are found on the same row, they are added up.
S70	Past Note Cut	—	Cuts all notes on a channel that are still playing due to New Note Actions.
S71	Past Note Off	—	Send a Note Off for all notes on a channel that are still playing due to New Note Actions.
S72	Past Note Fade	—	Fades out all notes on a channel that are still playing due to New Note Actions.
S73	NNA Note Cut	—	Sets the New Note Action to "Note Cut" for the currently active note.
S74	NNA Note Continue	—	Sets the New Note Action to "Continue" for the currently active note.
S75	NNA Note Off	—	Sets the New Note Action to "Note Off" for the currently active note.
S76	NNA Note Fade	—	Sets the New Note Action to "Note Fade" for the currently active note.
S77	Volume Envelope Off	—	Disables the volume envelope of the currently playing note.
S78	Volume Envelope On	—	Enables the volume envelope of the currently playing note.
S79	Pan Envelope Off	—	Disables the panning envelope of the currently playing note.
S7A	Pan Envelope On	—	Enables the panning envelope of the currently playing note.
S7B	Pitch Envelope Off	—	Disables the pitch envelope of the currently playing note.
S7C	Pitch Envelope On	—	Enables the pitch envelope of the currently playing note.
S8x	Set Panning	—	Sets the pan position of the current channel. The value ranges from 0h (left) to Fh (right). As this is very coarse, it is recommened to use the 8xx effect instead. As with 8xx, any instrument number resets the effect of this command.
S9x	Sound Control	—	Executes a sound control command, as described in the Sound Control table above. Only S91 is an original Impulse Tracker effect.
SAx	High Offset	—	Sets the high offset for subsequent offset (9xx) commands. x * 65536 (or 10000h) is added to all offset effects that follow this command.
SB0	Pattern Loop Start	—	Marks the start of a pattern loop.
SBx	Pattern Loop	—	When this effect is reached, playback is resumed at the loop start that was set with the SB0 command on this channel, x times in total. Pattern loops cannot span several patterns, but the last position of an SB0 effect is remembered across patterns, so if there was no SB0 command on the same pattern on a previous row, playback is restarted on the same row as the last SB0 effect.
SCx	Note Cut	—	Stops the sample after x ticks, if x is less than the current speed. SC0 behaves the same as SC1.
SDx	Note Delay	—	Delays the note or instrument change in the same pattern cell by x ticks. If x is greater than or equal the current speed, the content of this cell is never played. SD0 behaves the same as SD1.
SEx	Pattern Delay	—	Repeats the current row x times. Notes are not retriggered each time the row is repeated, but effects are still being processed. If several pattern delays are found on the same row, only the leftmost command is considered.
SFx	Set Active Macro	—	Selects the active parametered macro for this channel.

T0x	Decrease Tempo	Yes	Slides the tempo down by x BPM on all ticks but the first. Use T00 to recall the last slide parameter.
T1x	Increase Tempo	Yes	Slides the tempo up by x BPM on all ticks but the first. Use T00 to recall the last slide parameter.
Txx	Set Tempo	—	Sets the tempo if xx ≥ 20h.
Uxy	Fine Vibrato	Yes	Fine Vibrato with speed x and depth y. This command works like Hxy, but the vibrato depth is four times finer. This effect shares effect memory with Hxy (Vibrato).
Vxx	Set Global Volume	—	Sets the global (master) volume. xx must be a value between 00h (no audio output) and 80h (full volume).
Wxy	Global Volume Slide	Yes	This command's parameters works exactly like the Dxy parameters, with the difference that it affects the global volume rather than the sample volume. This command is also not supported by Scream Tracker 3, but by a variety of other trackers and players.
Xxx	Set Panning	—	Sets the pan position of the current channel. The value ranges from 00h (left) to FFh (right).
Yxy	Panbrello	Yes	Panbrello with speed x and depth y. This command oscillates the panning of the current note with a sine wave (you can change the vibrato waveform by using the X5x command). This is not an original Scream Tracker 3 effect.
Zxx	MIDI Macro	—	Executes a MIDI Macro.
\xx	Smooth MIDI Macro	—	Executes an interpolated MIDI Macro. This is not an original Impulse Tracker effect.

[†] **Effect Memory**:

- **No** means that this effect does nothing if the effect parameter is 00h.
- **Yes** means that this effect has a parameter memory. If the effect is called with the parameter 00h, the previous effect parameter on this channel is recalled. For example, if the effect H82 is followed by the effect H00 on a subsequent row, the H00 effect recalls the effect parameter 82h. Sometimes, parameter memory is shared between similar effects. If two effects share the same effect letter (e.g. N0x and Nx0), they generally use the same memory as well.
- **—** means that the effect parameter 00h has no special meaning. For example X00 sets the panning position to full left, B00 jumps to the first pattern, and so on.

Volume Column

The following commands can be entered into the volume column. All parameter values are **decimal**.

Effect	Name	Description
axx	Fine Volume Slide Up	Just like DxF, this slides the volume up x units on the first tick. This command shares memory with Dxy.
bxx	Fine Volume Slide Down	Just like DFx, this slides the volume down x units on the first tick. This command shares memory with Dxy.
cxx	Volume Slide Up	Just like Dx0, this slides the volume up x units on all ticks but the first. This command shares memory with Dxy.
dxx	Volume Slide Down	Just like D0x, this slides the volume down x units on all ticks but the first. This command shares memory with Dxy.
exx	Portamento Down	Just like Exx, this lowers the note frequency. Parameters are four times less precise than those of Exx, so for example E04 equals e01. This effect shares effect memory with Fxx, exx and fxx. If Compatible Gxx is disabled, it also shares effect memory with Gxx and gxx. If "More IT compatible playback" is activated, this command *always* uses linear frequency slides.
fxx	Portamento Up	Same as exx, but increases the note frequency.

gxx	Tone Portamento	Just like Gxx, this pitch-bends from the previous note to the current note. Parameters 1 through 9 translate to the following Gxx commands: G01, G04, G08, G10, G20, G40, G60, G80, GFF.
hxx	Vibrato Depth	Sets the vibrato depth to x and executes a vibrato (like the Hxy command).
pxx	Set Panning	Set the panning to x, where x ranges from 0 to 64 (decimal).
oxx	Sample Offset	Starts playing the sample at the position xx × 2048 (instead of position 0). This effect does not do anything if there is no note in the same pattern cell. This is not an original Impulse Tracker effect.
vxx	Set Volume	Sets the sample volume to x. This command is also sent to instrument plugins.

MPTM Effect Commands

OpenMPT′s own format is heavily based on the IT format and its effect command set.

Effect Column

The MPTM format generally makes use of the same effect commands as the IT format. However, there are some additional commands that cannot be used in the IT format:

Effect	Name	Memory†	Description
S7D	Force Pitch Envelope	—	Enables the pitch envelope and forces it to act as a pitch envelope (rather than a filter cutoff envelope)
S7E	Force Filter Envelope	—	Enables the pitch envelope and forces it to act as a filter cutoff envelope (rather than a pitch envelope)
:xy	Note Delay + Cut	—	A combination of the commands SDx and SCx. A note in the same pattern cell is delayed for x ticks and then cut after x + y ticks. Both actions are only executed if x and x + y respectively are less than the current speed.
#xx	Parameter Extension	—	Extends the parameter of a Pattern Break (Cxx), Offset (Oxx) or Tempo (Txx) command. If places **below** such a command, the parameter values are combined. If there is only one #xx command below the actual command (this is the limit for Cxx and Txx), the parameter of the original command is multiplied by 256 and the parameter of the #xx command is added. For the Offset command, up to four rows can be combined. The last row is then multiplied by 1, the row above it is multiplied by 256 (100h), the row above that row is multiplied by 65536 (10000h), and so on.

Parameter Control Events

Another feature that is only available in MPTM files are Parameter Control Events, which can be used to automate plugin parameters. They are explained in a separate article.

Zxx Macros

Zxx Macros are MIDI messages that can be sent to plugins or control internal parameters, such as the built-in resonant filter for samples or plugin parameter automation ("turning a knob" of a plugin). Macros are executed in patterns using the Zxx (MIDI Macro) or \xx (Smooth MIDI Macro) commands, hence the name. Macros can be used in the XM, IT and IT-type formats and are set up from the Macro Configuration dialog. For plugin parameter automation, the MPTM format also offers special Parameter Control Events with higher granularity than MIDI macros. Depending on the parameter of the Z command, a different macro is processed. Every macro can comprise one or more MIDI messages.

OpenMPT employs two types of macros: Parametered and fixed macros. While fixed macros always transmit the same MIDI message, parametered macros depend on the parameter of the Zxx command. Fixed macros, however, are not necessarily compeltely static. They can for example depend on the current instrument's volume and panning settings.

Parametered Macros

There are 16 parametered macros. Only one of those 16 parametered macros can be active on a channel at a time, and it is controlled using the commands Z00 through Z7F. Parametered macros can switched by using the SFx command in IT-type tracks and EFx in XM tracks. SF0 / EF0 activates the first parametered macro, SF1 / EF1 the second and so on. By default, the first macro is active, but if you want to switch to a different parametered macro on a channel, you first have to put the appropriate SFx / EFx effect on a row above the first usage of the macro.

Example of switching macros on a channel

In the example on the right, the third macro is recalled on the first row, and some Zxx and \xx commands on the subsequent rows execute this parametered macro. Row 6 switches back to the first macro, which is then applied on row 7.

Fixed Macros

There are 128 fixed macros which can be called by the commands Z80 through ZFF (and \80 through \FF respectively). By default, The macros Z80 through Z8F control the resonant filter's resonance amount and Z90 through ZFF do nothing. In theory, every of the 128 fixed macros can do something completely different, while all 128 instances (Z00 through Z7F) of the same parametered macros do the same thing, just with a different parameter. For example, you could configure the fixed macros Z80 through Z8F to control the resonance of the resonant filter, Z90 to activate the lowpass filter (F0F00200), Z91 to activate the highpass filter (F0F00210), Z92 to set the Dry/Wet ratio of the current plugin to 100% Dry (F0F00300), Z93 to set it to 100% Wet (F0F0037F), and so on. You can even configure a single macro to change a number of parameters at once. For example, you could set a plugin's first parameter to 0 and its Dry/Wet ratio to 50% (F0F08000 F0F00340).

Macro Types

Some of the MIDI messages that can be generated through a macro are handled internally by OpenMPT, others are directly sent to plugins. Here is an overview of all macro types.

Resonant Filter Control

OpenMPT's resonant filter can be controlled through internal macros. They can be used for setting the cutoff frequency, resonance amount and filter type. The resonant filter is only applied to samples — it does not affect the output of plugins. If you want to filter the output of a plugin, you will have to route its output to a filter or equalizer plugin.

Spectrum analysis of a saw wave. First, the unfiltered saw sample, then the same sample with a lowpass filter applied and the same sample with a highpass filter applied.

The following MIDI messages modify OpenMPT's resonant filter:

- **F0 F0 00 xx**: Set cutoff frequency, where xx is a hexadecimal number between 00h (lowest cutoff frequency) and 7Fh (highest cutoff frequency). The highest cutoff frequency is determined by the Extended Filter Range option, which can be found in the Song Properties.

- **F0 F0 01 xx**: Set filter resonance, where xx is a hexadecimal number between 00h (no resonance) and 7Fh (full resonance). The higher the resonance, the more the cutoff frequency is "stressed" or "accented" — it resonates.

- **F0 F0 02 00**: Activate lowpass filter. Frequencies above the cutoff frequency are reduced, frequencies below the cutoff frequency are not affected. A low cutoff frequency will make the sample sound muffled, a higher cutoff frequency reduces the effect. Look at the second spectrum graph on the right for an example.

- **F0 F0 02 10**: Activate highpass filter. Frequencies below the cutoff frequency are reduced, frequencies above the cutoff frequency are not affected. A high cutoff frequency will make the sample sound thinner, a lower cutoff frequency reduces the effect. Look at the third spectrum graph on the right for an example.
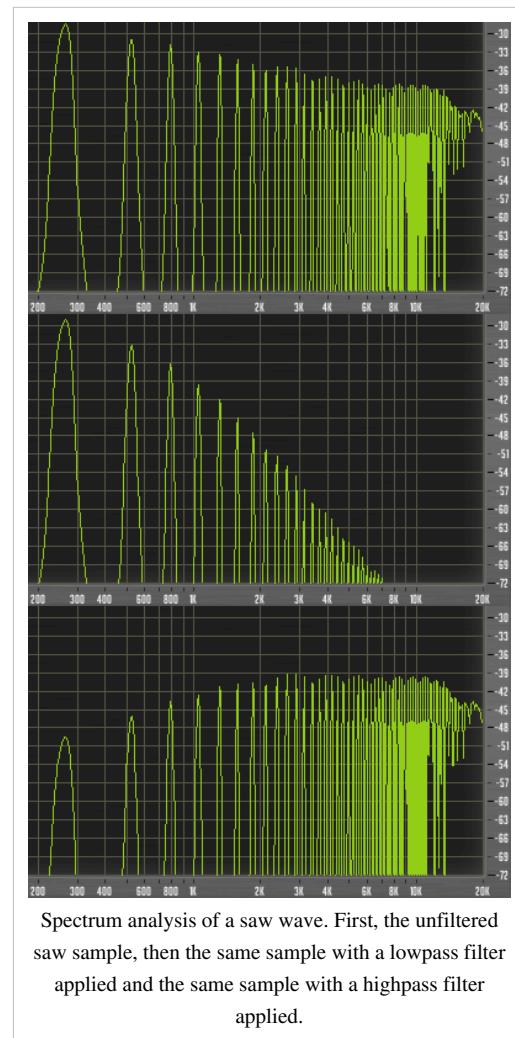
The filter type settings (lowpass / highpass) are mutually exclusive, i.e. you can only **either** cut off high frequencies **or** low frequencies.

The default parametered macro controls cutoff frequency and the default fixed macros control the resonance amount. Note that all these filter settings can also be set up for each instrument.

No sample needs to be playing to apply filter macros; they will be applied to whatever sample is playing next, unless the instrument settings would override the macro's functionality.

Plugin Dry/Wet Ratio

This is another internal macro that is handled by OpenMPT. It adjusts a plugin's Dry/Wet ratio (which can otherwise be set from the plugin setup on the General Tab) of the currently active plugin on the channel the macro is executed. The MIDI message for this macro type is **F0 F0 03 xx**, where xx is a hexadecimal number between 00h (0% Wet / 100% Dry) and 7Fh (100% Wet / 0% Dry).

Only the first plugin in a plugin chain is affected by this macro, and channel plugins are generally preferred over instrument plugins.

Plugin Parameter Control

Plugin Parameter Control is another internal macro type that is handled by OpenMPT. It sets a given parameter of a plugin to a given value. However, this parameter control is limited to the first 384 parameters and is very coarse. Parameter control is not bound to a specific plugin, but rather changes the given parameter of whatever plugins is currently active on the channel the macro is executed.

The first 128 plugin parameters (0 through 127) can be controlled by the MIDI message **F0 F0 xx yy**, where xx is the parameter number + 80h and yy is the parameter value, ranging from 00h to 7Fh. Parameters 128 through 383 can be controlled by the MIDI message **F0 F1 xx yy**, where xx is the parameter - 80h and yy is the parameter value.

In the MPTM format, this macro type is superseded by Parameter Control Events, which provide finer control of more paramters (the first 1000 parameters of any plugin can be controlled).

Only the first plugin in a plugin chain is affected by this macro, and channel plugins are generally preferred over instrument plugins.

External Messages

Any macro that is not covered by the above macro types is an **external** message, i.e. it is not handled or interpreted by OpenMPT itself but is rather sent to plugins. Since OpenMPT can neither know the meaning of such external messages, nor their previous parameter state (which is necessary for interpolation), **\xx behaves the same as Zxx** for those messages. External messages include MIDI CCs, Channel and Polyphonic Aftertouch, note events and generally any kind of MIDI event.

The MIDI message is only sent to the first plugin in a plugin chain, and channel plugins are generally preferred over instrument plugins.

MIDI Reference

Overview

Before the early 1980s, there was no common language or electronic message system that was shared between synthesizers. Then in 1982 a protocol was outlined to allow commands or other electronic messages to be used to control or read synthesizer data in more-or-less a universal format. It was dubbed the Musical Instrument Digital Interface or MIDI for short. MIDI transmissions are only electronic event messages rather than audio signals, and are designed to allow each synthesizer to produce and process audio in its own way, but be controlled using somewhat universal commands.

For example, you can play notes, bend their pitches, control panning positions, or sync timers between synthesizers of different makes and models, using a single set of commands understood by all devices. Because the electronic stream is data rather than audio waveforms, the files that contain these event messages are quite small, compared to other means of creating electronic music.

In the 1980s, MIDI allowed for digital composition to be done on computers or specialized electronic devices called **sequencers**. Sequencing used the MIDI language to make it easy to record and edit events that would control MIDI synthesizers, and even trigger it to play back the audio, which could be recorded to an audio medium. While file sizes are small and the commands can be understood by any MIDI-compatible device, the disadvantage is that the song will probably sound different on different synths, because each have their own means of producing sounds, especially among synthesizer companies.

This problem was somewhat addressed by the advent of General MIDI, or GM, which is simply a set of pre-defined preset instrument programs, that any sequencer file can call to produce a universal playback sound (though the actual instruments may still differ in timbre), no matter what synth is used. The GM standard not only assigned specific instruments to particular program numbers, it also mapped many MIDI controllers to important synthesis effects, set minimums for polyphony and number of channels, and assigned internal samples to instruments. GM is still in use today, and even has been expanded into different formats like Roland's GS and Yamaha's XG, as well as the more recent GM2 specifications present in many newer synthesizers.

Many of the synthesizer parameters that can be manipulated are done so using MIDI messages that work in each channel, of which there are only 16. While the channels are limited to 16, one can send Program Change messages to call up different instruments. But this means that one synth can only play a maximum of 16 instruments at once (although each instrument can have more than one multisample assignments). But this instrument limitation is not the same as polyphony, which limits the number of notes or voices.

These MIDI channel messages are only a few bytes in length, which make for excellent translation speed between the event and the parameter control. In a normal playing of a note on a keyboard, here is an example of the messages that are and can be sent:

- When the user presses a note key, the Note On message is sent, which is a data package that contains the note (within a range of 0 to 127, the range of notes of the MIDI keyboard) and the **key velocity**, the strength that the note was struck. Some synthesizers may interpret this as **note volume** and some programs may control different parameters of the instrument based on velocity amount.
- If the user continues applying pressure to the synth keys while holding them (this is called **aftertouch**), the synth will send either aftertouch messages from each key (also called **Poly Pressure**) , or **channel pressure** messages, which applies the aftertouch to the whole keyboard.
- When the user releases the keys, a Note Off message is sent, which also contains the release velocity of each note, which is the strength of each key being released.

Not all synthesizers pass or understand all of these parameters; the only ones that are truly universal are the note values for Note On and Note Off messages. Furthermore, many synthesizers offer ways of affecting the instrument settings as they are being processed, such as Pitch Bend and Modulation wheels, joysticks, data sliders, knobs and buttons, foot controllers and pedals, breath controllers, and ribbon controllers. All of these send their own messages using their own controller numbers, which can sometimes be assigned by the user, depending on the synth model.

MIDI Messages

The data blocks commonly referred to as MIDI Messages are sent serially in one-way paths from one MIDI device's "MIDI Out" connector to the other device's "MIDI In" connector ("MIDI Thru" passes on the MIDI-In signal to another device). The messages are simple but specific, often taking the form of commands that not only control various synth settings like pitch, volume, key pressure, and filters, but also change programs or banks or toggle arpeggiations or on-board effects. Many of these messages have a universal scope of application, but not all do; each company can set its own use for the MIDI controller messages, and even different devices from the same company will use the same controller assignments to manipulate different parameters.

There are basically eight types if MIDI messages:

- **Notes**: MIDI has 127 notes represented, from C-1 to G9 (the equivalent of C-0 to G-10 in OpenMPT's octave range, notes above B-9 are not available in OpenMPT), or 0 - 127. Using Western tuning this is the range from 8.176 Hz to 12,544 Hz. Sending a note value with velocity greater than 0 is considered a Note On message.
- **Key Pressure**: An aftertouch message is sent when notes that are on are being pressed with non-static pressure. Most synthesizers still use Channel Pressure messages that apply aftertouch to the entire keyboard, while some more expensive synths send Poly Pressure (also called Polyphonic Aftertouch) messages from each pressed key (which require more sensors in the assembly). These two types of aftertouch are often not found together in the same keyboard.
- **Pitch Bend**: In OpenMPT, this is called portamento, but it increases or decreases the pitch of the note smoothly in 64ths of a semitone (or by single semitones if a glissando setting is enabled). These messages bend the synthesizer notes by up by a pre-defined amount of semitones up or down in one event. Not all synthesizers might respond to the appropriate MIDI message for setting up the pitch bend range.
- **Control Change**: For all other instrument parameters that can be manipulated, MIDI CC messages are assigned by the manufacturer to control certain settings. While there is a standardized set of controls, there is a certain amount of flexibility by each synth maker, so do not assume that a standard CC command will control a listed parameter. For clarity, you must check each synthesizer's MIDI implementation table.
- **Program Change**: These special messages call up another program (or patch) from the synthesizer. There is also a type of channel message that changes banks.
- **System**: These are specialized messages such as MIDI clock ticks that stay in sync with the clocks of other MIDI devices, and Active Sense messages that keep the connection between inactive MIDI devices. System messages are like the heartbeat or digestive movements; they are internal and automatic.
- **System Exclusive (SysEx)**: These messages are usually non-MIDI data dumps or device settings that each manufacturer defines for its devices. This type of message is rarely used by non-programmers except for backup purposes.
- **Real-Time System Exclusive**: These are the newer type of MIDI messages that control the interaction and communication of MIDI-compatible equipment that activate light or other entertainment devices. These devices are designed

mainly for stage shows and concerts.

OpenMPT Setup

In order for ModPlug to make use of MIDI communication, it has to be able to receive and understand incoming MIDI data as well as send MIDI messages in the proper syntax. OpenMPT's MIDI implementation is not complete but should suffice; however, in order to use external MIDI devices you need to have a proper setup.

Originally OpenMPT was not designed for MIDI input or output but several features and workarounds have been added to allow you to use an external MIDI device both for entering notes and for playback. This makes it easy to input notes if you are used to composing from a musical keyboard. But it also increases the functionality of OpenMPT by being able to send notes to via MIDI and play back the synthesizer or device like a sequencer.

Below is the procedure for using your MIDI device with OpenMPT. If you are not using a MIDI device, you can skip this section.

Enabling MIDI Input

1. Plug your MIDI device into your computer. Unless the device has a PC-specific port (serial or USB), or your computer has a MIDI-specific input, you will probably need a special converter plug to transfer MIDI messages between the two. Check your device's manual to make sure you have the correct connection. Many newer computer models no longer use serial ports, but some older MIDI synths provided them. If you are planning to purchase a MIDI device for use with OpenMPT, it is advisable to get one with USB connections, since they are generally the most universal and they have a higher data exchange speed and reliability.

Setup icon

2. Click on the Setup icon in the Main toolbar, or alternatively, select the Setup menu item from the View menu). The Setup dialog will open.
3. Click on the MIDI tab to see the MIDI Setup page, shown on the right.
4. In the MIDI Input Device list, make sure the correct input for your MIDI device is selected.

MIDI Record icon

5. In the Main Toolbar, select the MIDI Record button, depicted on the right. Enable **MIDI Record** in the General Setup to have this enabled by default.
6. Now while editing in the Pattern Editor, notes played on your MIDI keyboard will input the corresponding notes in the pattern.
7. To assign a MIDI controller to a macro for output (so that you can manipulate MIDI parameters of an external MIDI device during playback), see the section on Zxx Macros.
8. To control plugin parameters using incoming MIDI data, you can set up parameter routing from the MIDI Mapping dialog.

Enabling MIDI Output

OpenMPT cannot access MIDI hardware from the application itself, but a plugin called **MIDI Input / Output** is shipped with OpenMPT to allow for easy MIDI routing.

However, this plugin is more than just an instrument plugin to send out MIDI data; As the name suggests, it can also be used to capture incoming MIDI events. While this might not seem useful at first, it brings some advantages over the default MIDI input in some cases:

- Several plugin instances can be opened at once to allow for multiple MIDI inputs.
- The incoming MIDI events are *only* routed to the next chained plugin.

Combining these two previous points, you can use the plugin to control another instrument plugin exclusively using the MIDI data from the MIDI plugin. Only the selected output plugin of the MIDI plugin will receive this input. At

the same time, this also means that the MIDI events captured by this plugin cannot be recorded to the pattern editor.

You can set up plugin chains with several MIDI processing plugins to go crazy: How about sending the MIDI events captured by this plugin to an arpeggiator plugin, and then send the arpeggiated MIDI data generated by that plugin to another instance of the MIDI Input / Output plugin to control external gear that has no built-in arpeggiator? It's up to you!

Here is a short tutorial on setting up the MIDI Input / Output plugin to control external MIDI:

Interface of the MIDI Input / Output plugin

1. If not done already, add the MIDI Input / Output plugin to OpenMPT's plugin list using the Plugin Manager.

2. Open or create a track in XM / IT / MPTM format.

3. In the General page, in the Plugin section at the bottom half of the page, make sure the current plugin is empty, and click on the "Select" button next to it. The Plugin Manager window will open.

4. Find the MIDI Input / Output plugin (it should be in the instruments category). Click on it, and click on the top button ("Put in FX01" or whatever slot you are putting it into).

5. Now you can click on the Edit button to see its interface, shown on the right. Click on the dropdown list under "MIDI Output Device" to choose the MIDI port to route MIDI data to.

6. Now you must assign an instrument to the VST. This can be done from the plugin editor's **File** menu. You can then use the newly created instrument to send note data to the MIDI Input / Output plugin, which in turn will send it to the port where your MIDI instrument receives its data. This should play the MIDI instrument.

Tunings

What are tunings and when do I need them?

Tunings in ModPlug Tracker are variations of the 12-tone Equal Temperament (12-TET) that most Western music has used since the 17th century. Without getting into too much history, 12-TET was developed so that all notes at any octave would sound harmonious and "in tune". Now 12-TET is the standard to which all keyboard and electronic synthesizers adhere to, and it is the default in OpenMPT. However, in the MPTM format, you can apply tunings to samples so that the note is different than the default format.

But there are two types of tunings — scales and temperaments. Scales are simply a variant of the labels that are used for the names of notes. All trackers name their notes in what could be called the "B chromatic scale" — C C♯ D E F F♯ G G♯ A A♯ and B, in which all the black keys of the keyboard use sharp notation rather than flat. But ModPlug also has a flat character, so it's possible to have the black keys named in flats, so that you get C D♭ D E♭ E F G♭ G A♭ A B♭ and B — the D-Flat chromatic scale. But in order to use flat keys, you have to use a scale that provides these new labels. While you can have a scale with both sharps and flats among the note names, you can only apply one scale to an instrument.

Temperaments, on the other hand, change the actual pitch of the played sample. This is useful for emulating acoustic, "non-temperable" instruments, such as flutes and saxophones, or for non-Western music, many of which use tunings that are neither 12-tone nor of equal temperament, such as Chinese or Arabic music. The pitch modifications for tempered notes are only very slight, but are quite noticeable when applied to certain scales or chords.

ModPlug Tracker can apply a scale to any instrument, but temperaments can only work on samples (not external MIDI instruments or VST instruments). If you wish to apply a pitch-altering tuning to these, you must use a third-party VST, such as Tobybear's MicroTuner [1]. However, this plugin does not use OpenMPT tuning files, so tunings are only interchangeable if they are in the Anamark tuning or Scala tuning format.

Creating Tunings

Tunings can only be applied in the MPTM format, and they are only available in instrument mode — if you only use samples in your tune, you cannot apply custom tunings. In that case, you will have convert your samples to instruments, which can be done by simply creating a new instrument on the instruments tab. On this tab, you will also find a dropdown list on the right from which you can select an existing tuning to be used with this instrument, or choose

The Tuning Properties dialog is used to create and edit advanced sample tunings.

Control tunings from this list to open the Tuning Properties.
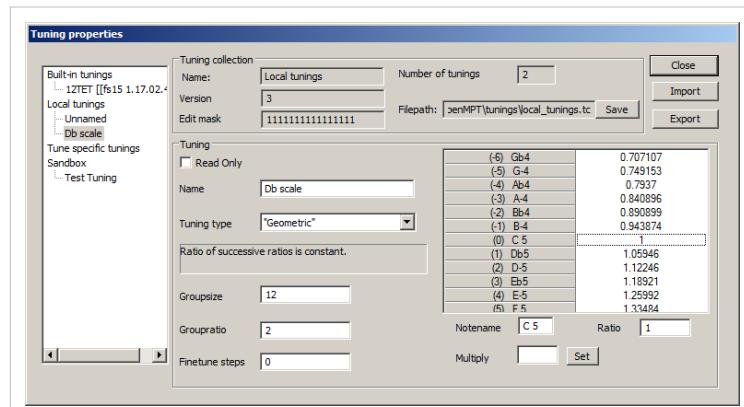
In this dialog, you can start off with editing a new tuning by right-clicking the tuning collection it should belong to and choosing **Add tuning**. After having done that, you can begin changing the note names or their pitches. When using "General" tuning type, you have to rename every note and input every pitch value for every note (those you wish to modify from the default). Everything is completely manual but you can define everything independently.

Or you can use "Geometric" to have the values automatically scaled for every note. You can still relabel the notes but you can only do them for one octave; the naming standard you use will be applied to all octaves.

Note: When tuning by Geometric ratios, the "5" will be automatically entered as the last digit in the note name, so for example if you wanted to name that note C.5, only enter "C." — the 5 is added, and all other octaves are adjusted accordingly. So even though you can change the note name, you cannot change the octave designation.

To enter your tuning with Geometric ratios (whose ratios do not change for every octave), select the "Geometric" tuning type. Then enter the number of notes in your octave in the **Group Size** field; the "Group Size" is the number of notes in your "octave," which does not have to be an octave in the traditional sense. For the classical Western temperament, there are twelve, and the whole tone scale has six in a "Group Size". In the Group Ratio field, enter the pitch change for every Groups Size. Usually this would be 2, meaning the pitch (in Hertz) is doubled an octave higher, and halved an octave lower. Press Tab (to go to the next field and apply the changes) and the tuning for each note will be adjusted in the note list.

You can easily change the labels with a little understanding of how the interface works. To select a note, click on any note or its value in the note list on the right. The note is automatically centered in the window, highlighted, and its values placed in the fields below the window. To change the label for the currently selected note, click in the Note Name field. This is a text editing field but there are two important restrictions. First, you only have 3 spaces to work with. Second, while you can use any character your keyboard can type, the only ones that show up in the Pattern Editor (in the note column) are capitals A-Z, 0-9, and the symbols ? # b \ : - and space. It is best to use a standard, constant format for the note labels; the default for OpenMPT is TSO, where T is the tone (A-G), S is the symbol (such as # or b), and O is the octave (0-9).

Only one tuning can be assigned to an instrument at a time, so if you want the same sample to be played with various tunings, you will have to duplicate the instrument by Shift-clicking the **New Instrument** icon on the instrument page.

Applying Tunings

Unfortunately you cannot try your tunings in the Tuning Properties dialog, nor will a playing track use the new tunings while they are being edited. You will first have to close the dialog and assign the tuning to your instrument. This will instantly change all the note labels everywhere that instrument plays a note (the note **must** have an instrument number in the same pattern cell for this to work!) if you have chosen to use custom note names. In the example on the right, you can see a custom tuning being applied to an instrument in the pattern editor.

Example of applying a custom tuning

Hint: For VST instruments or MIDI instruments that apply different drum samples to each note, such as a kick to C-5 and a snare to D-5, you could create a tuning that changes the note names to abbreviations of these percussive samples. So, for example, you can relabel "C-5" to "KIK" and "D-5" to "SNA" — While this will not change the pitch of those notes, it will still look different in the pattern.

When using portamento commands with glissando, the notes will adhere to the pitches assigned in the tuning.

References

[1] http://www.tobybear.de/p_midibag.html

Keyboard Actions

This is a list of all customisable keyboard actions in OpenMPT. They can be configured in the Keyboard Setup dialog.

Global Keys

Global keyboard shortcuts work on most parts of OpenMPT as long as one of the program's windows is focussed. **Note**: Some keyboard shortcuts are ignored when the input focus is within a text field.

Shortcut	Description
File/New	Creates a new song. The currently edited song is not closed, as OpenMPT can have multiple documents open at the same time.
File/Open	Shows the dialog to open an existing song.
File/Close	Closes the current song. You are prompted to save the song if it has been modified.
File/Close All	Closes all open songs. You are prompted to save modified songs.
File/Save	Saves the song to disk.
File/Save As	Allows you to save the file with a new name or in another folder.
File/Save As Template	Creates a template from the current song.
File/Export as Wave	Exports the current track into a .wav file in the folder you choose.
File/Export as MP3	Exports the current track into an .mp3 file in the folder you choose.
File/Export to MIDI	Exports the current track into the .mid format. See the section on MIDI export for a detailed explanation of how this file is exported.

File/Compatibility Export	Exports the current track without any file format hacks to its original format.
Previous Document	Goes to the previous tracking file that is open (these are visible in the Windows Menu).
Next Document	Goes to the next tracking file that is open (these are visible in the Windows Menu).
File/Import MIDI Library	Imports the MIDI Instrument Library of your choosing. The MIDI Library can be accessed from the Tree View.
File/Add Sound Bank	Imports a sound bank of your choosing. Sound banks can be accessed from the Tree View.
Play Song / Pause Song	Toggles the playback of the current track. The playback pointer is not reset when using this toggle; that is, it plays from where the pointer left off when it was last pressed.
Pause Song	Only stops the playback of the current track but does not reset the playback pointer.
Stop Song	Stops the playback of the current track and resets the playback cursor to the start of the song.
Play Song from Start	Resets the playback cursor to the very first row and begins playback from there.
Play Song from Cursor	Resets the playback cursor to the row where the editing cursor is set, and begins playback from there. Playback will continue until the end of the track.
Play Pattern from Start	Resets the pointer to the first row of the current pattern, and begins playback from there. It will stop at the end of the pattern (or loop within the pattern if Loop Pattern is enabled).
Play Pattern from Cursor	Resets the pointer to the row where the editing cursor is set in the current pattern, and begins playback from there. It will stop at the end of the pattern (or loop within the pattern if Loop Pattern is enabled).
Panic	Stops all sample and VST instrument voices.
Estimate Song Length	Estimates the playback length of the entire track.
Show approx. real BPM	Estimates the beats per minute of the song, based on the Initial tempo and the number of ticks per row, plus the Tempo Mode in the Song Properties dialog.
Toggle MIDI Record	Toggles the MIDI Record option.
Undo	Rescinds the last edit in the pattern or sample editor.
Cut	Copies the selected pattern, sample or instrument data into the clipboard, then removes it from the selection it occupies.
Copy	Copies the selected pattern, sample or instrument data into the clipboard.
Paste	Pastes the selected data at the location of the cursor, but Paste acts differently on the type of data.With pattern data, clipboard contents are pasted in the same row at the same column of the current (visible) Pattern where the cursor is located, overwriting any pattern data that falls within the paste area. With sample data, clipboard contents replcae the **whole** sample.
Mix Paste	Clipboard contents are pasted in the same row at the same column of the current (visible) pattern where the cursor is located, except where there is already any data in any corresponding field of the paste area.
Mix Paste (IT Style)	For detailed differences between Mix Paste and Mix Paste (IT Style), consult the Pattern Editor help.
Paste Flood	Clipboard contents are pasted from the cursor, repeating the data paste until every row in the pattern has been filled and pasting over any data in its path.
Push-Forward Paste	Clipboard contents are inserted at the row of the cursor, and pushing all data below that row further down the pattern. Any data of the affected channels pushed beyond the pattern's row limit is deleted.
Toggle Overflow Paste	When enabled, pasting will continue to the next pattern if the data overflows the current pattern.
Select All	Selects all pattern or sample data.
Find / Replace	Opens the Find/Replace dialog, which allows you to search for and/or replace given pattern data. Find starts from the cursor location.

Find Next	Applies the current Find settings and searches for the next data that matches it, selecting the given data; however, it does not set the cursor in that row. For Find to be used again, the cursor must be set in the current pattern, then Find Next searches the entire row (in each channel) before going to the next row.
View General	Opens the General Tab.
View Pattern	Opens the Pattern Tab.
View Samples	Opens the Sample Tab.
View Instruments	Opens the Instrument Tab.
View Comments	Opens the Comments Tab.
Toggle Main View	Shows / hides Main toolbar.
Toggle Tree View	Shows / hides Tree View.
View Options	Opens the Setup dialog.
View Channel Manager	Opens the Channel Manager.
View Plugin Manager	Opens the Plugin Manager dialog.
Show Song Properties	Opens the Song Properties dialog.
View MIDI Mapping	Opens the MIDI Mapping dialog.
View Edit History	Opens the Edit History.
Help (to do)	Opens the manual (currently not functional)
Previous instrument	Changes the current instrument to the previous one in order.
Next instrument	Changes the current instrument to the next one in order.
Previous octave	Changes the current octave to the next lower octave.
Next octave	Changes the current octave to the next higher octave.
Previous order	Changes the current pattern to the previous one in the pattern order. If the pattern ID is the same the display will not change.
Next order	Changes the current pattern to the next one in the pattern order. If the pattern ID is the same the display will not change.

Pattern

Order List

These keyboard shortcuts operate while the cursor focus is in the Order List.

Shortcut	Description
Delete Order	Erases the currently selected pattern(s) in the Order List (the pattern itself is not removed, only the reference).
Insert Order	Duplicates the currently selected patter *reference*(s) in the Order List.
Edit Pattern	Resets the Pattern Editor to show the highlighted pattern.
Switch to Pattern Editor	Moves the cursor focus to the Pattern Editor.
Previous Order	Selects the previous pattern in the Order List.
Next Order	Selects the following pattern in the Order List.
First Order	Selects the first pattern in the Order List.
Last Order	Selects the final pattern in the Order List.
Pattern Index Digit 0-9	Enters the respective numeral into the pattern ID box.
Increase Pattern Index	Adds one to the pattern number, up to the highest indexed pattern.
Decrease Pattern Index	Subtracts one from the pattern number, to a minimum of index 0.
Separator Index	Adds a separator pattern item (+++) at the current position.
Stop Index	Adds a stop pattern item (---) at the current position.
Lock Playback to Selection	Song playback is locked to the patterns in the current order selection.
Unlock Playback	If playback has been limited to an order selection before, the playback lock can be removed here.

Quick Channel Settings

These keyboard shortcuts operate while the Quick Channel Settings dialog is open.

Shortcut	Description
Previous Channel	Shows the channel settings for the previous channel.
Next Channel	Shows the channel settings for the next channel.
Switch to Pattern Editor	Closes the dialog and returns to the Pattern Editor.

General Context

These keyboard shortcuts will only work if the cursor focus is within one of the columns of the Pattern Editor, except where noted. When navigating (moving the cursor) to before the first row or after the last row in the pattern, the cursor "wraps" to the other side of the same pattern, if the "Cursor Wrap" option is enabled (in the Options section of the General tab of the Setup dialog). If navigating beyond the first or last row when the "Continuous Scroll" option is enabled, the cursor will instead move to the previous/next pattern in the order list.

Shortcut	Description
Navigate down by 1 row	Moves the cursor to the next row in the same column.
Navigate up by 1 row	Moves the cursor to the previous row in the same column.
Navigate down by spacing	Moves the cursor down by the value in the Row Spacing field.
Navigate up by spacing	Moves the cursor up by the value in the Row Spacing field.
Navigate left	Moves the cursor to the previous column in the same row, going to the previous channel's last column if moving from the first column of the current channel.
Navigate right	Moves the cursor to the next column in the same row, going to the next channel's first column if moving from the last column of the current channel.
Navigate to next channel	Moves the cursor to the same column in the same row in the next channel.
Navigate to previous channel	Moves the cursor to the same column in the same row in the previous channel.
Jump down by measure	Moves the cursor down by the number in the Rows/measure field (of the Song Properties dialog).
Jump up by measure	Moves the cursor up by the number in the Rows/measure field (of the Song Properties dialog).
Jump down by beat	Moves the cursor down by the number in the Rows/beat field (of the Song Properties dialog).
Jump up by beat	Moves the cursor up by the number in the Rows/measure field (of the Song Properties dialog).
Snap down to measure	Moves the cursor down to the first row of the next measure, as determined by the number in the Rows/measure field (of the Song Properties dialog).
Snap up to measure	Moves the cursor up to the first row of the previous measure, as determined by the number in the Rows/measure field (of the Song Properties dialog).
Snap down to beat	Moves the cursor down to the first row of the next beat, as determined by the number in the Rows/beat field (of the Song Properties dialog).
Snap up to beat	Moves the cursor up to the first row of the previous beat, as determined by the number in the Rows/beat field (of the Song Properties dialog).
Go to first channel	Moves the cursor to the first column of the first channel in the same row.
Go to first row	Moves the cursor to the first row of the same channel in the same column.
Go to first row of first channel	Moves the cursor to the first column of the first channel in the first row.
Go to last channel	Moves the cursor to the last column of the last channel in the same row.
Go to last row	Moves the cursor to the last row of the same channel in the same column.
Go to last row of last channel	Moves the cursor to the last column of the last channel in the last row.
Previous pattern	Displays the previous pattern in the order list, moving the cursor to its equivalent position in it.
Next pattern	Displays the next pattern in the order list, moving the cursor to its equivalent position in it.
Selection key	The modifier key to be used to extend the selection when navigating with keyboard shortcuts.
Copy select key	The modifier key to be used to copy the selection when dragging with the mouse.
Select channel / Select all	Toggles the "select all" method, either all events in the current pattern of the current channel where the cursor is located, or all events in the pattern.
Copy and lose selection	Copies the selected events to the clipboard and unselects them.
Clear row	Deletes all event data in the same row in the current channel.
Clear field	Deletes the selected pattern data, or just the data under the current cursor position if no selection has been made.
Clear field (IT Style)	Same as "Clear field", but also clears the instrument number if a note event is selected.

Clear row and step	Same as "Clear row", but also moves the cursor by the number of rows in the Row Spacing field.
Clear field and step	Same as "Clear field", but also moves the cursor by the number of rows in the Row Spacing field.
Clear field and step (IT Style)	Same as "Clear field (IT Style)", but also moves the cursor by the number of rows in the Row Spacing field.
Delete rows	Deletes the same number of rows as the selection, affecting the same number of channels where the selection extends; the data is moved up to replace the cleared data, and extra rows are added in the affected channels so that the row number remains the same.
Delete all rows	Deletes all event data in the selected channels.
Insert Row	Moves event data in the current and following rows in the selected channel down one row. Event data in the last row of those channels is deleted.
Insert All Rows	Moves event data in the current and following rows in all channels down one row. Event data in the last row of all channels is deleted.
Mute current channel	Toggles the sound output (mute) for the channel where the cursor is located.
Solo current channel	Toggles the sound output (mute) for all channels except the one where the cursor is located.
Unmute all channels	Activates the sound output for all channels, regardless of Mute status.
(Un)mute channel on pattern transition	Toggles the sound output (mute) for the channel where the cursor is located, but the change takes place when the current pattern is finished playing.
Unmute all channels on pattern transition	Activates the sound output for all channels, regardless of Mute status, but the change takes place when the current pattern is finished playing.
Solo channel on pattern transition	Toggles the sound output (mute) for all channels except the one where the cursor is located, but the change takes place when the current pattern is finished playing.
Reset Channel	Stops all note processing, and resets all channel variables to their defaults (volume, panning, etc.).
Quick Channel Settings	Opens the Quick Channel Settings dialog for the channel where the cursor is located.
Transpose +1	Raises by one the note number of the currently selected notes.
Transpose -1	Lowers by one the note number of the currently selected notes.
Transpose +12	Raises by one the octave number of the currently selected notes.
Transpose -12	Lowers by one the octave number of the currently selected notes.
Amplify selection	Opens a dialog to change the note volume commands of the selected volume data.
Interpolate Note	Transitions smoothly (using all available notes) between notes in the selection, filling in (and replacing if necessary) all rows with new note data.
Interpolate Volume	Transitions smoothly between data amounts in the selection, filling in (and replacing if necessary) all rows with new volume effects. The first and last rows of the selection must contain the same volume effect, or one of the two rows might be empty.
Interpolate Effect	Transitions smoothly between data amounts in the selection, filling in (and replacing if necessary) all rows with new effect data. The first and last rows of the selection must contain the same effect, or one of the two rows might be empty. Different effects within the selection are not overwritten.
Open effect visualizer	Opens the Params Editor dialog.
Go to row/channel/…	Opens the Go To dialog to allow you to display a prompted pattern.
Apply current instrument	Applies the current instrument to all cells in the selection that contain note data.
Grow selection	"Expands" the selection by doubling the number of the selected rows, and evenly spacing out the event data within it. The expansion will replace event data below it in the same channels as the selection.
Shrink selection	"Shrinks" the selection by deleting every other row of the selection. However, if only part of any row is selected, the data corresponding to the deleted selected data is also deleted.
Toggle follow song	Toggles the "Follow Song" function.

Quick copy	Copies only one event of data (where the cursor is located) to OpenMPT's "Quick" clipboard; the standard clipboard is not erased. Each column pair has its own Quick clipboard.
Quick paste	Pastes the data in OpentMPT's "Quick" clipboard to the location of the cursor. The data last saved in that column's clipboard will be pasted in the cursor's corresponding column.
Enable Recording	Toggles the Event Record feature. When enabled, patterns may be edited.
Play Row	Process and play only the events in the current row where the cursor is located.
Set row jump on note entry	The modifier key(s) that, when pressed with digits 0-9, allows you to change the Row Spacing amount without using the mouse or moving the cursor focus out of the editor.
Increase Row Spacing	Increases the Row Spacing by one row.
Decrease Row Spacing	Decreases the Row Spacing by one row.
Switch to Order List	Toggles the cursor focus between the pattern editor and the current pattern in the Pattern Order list.
Insert new pattern	Inserts a new blank pattern after the current pattern, displays it, and moves the cursor to the same position in it. Also functions when cursor focus is in the Order list.
Duplicate Pattern	Inserts a new pattern with the current pattern's contents.
Edit Plugin assigned to PC Event	Opens the editor for the plugin of the selected Parameter Control Event.
Toggle channel's plugin editor	Opens the editor for the current channel's assigned plugin.
Show Note Properties	Opens the Note Properties dialog, where you can assign any event data to the current row of the current channel.
Show Pattern Properties	Opens the Pattern Properties dialog.
Show MIDI Macro Configuration	Opens the MIDI Macro Configuration dialog.
Split Keyboard Settings dialog	Opens the Keyboard Split dialog.
Toggle Loop Pattern	Toggles the Loop Pattern feature.
Show Context (Right-Click) Menu	Opens the context menu at the cursor location without using the mouse.
Show playback time at current row	Shows the estimated time within the track at the start of the current row.

Note Column

These shortcuts are applied when the pattern editor has focus and the cursor is in the note column (the first column).

Shortcut	Description
Base octave [note]	Enters a note in the octave indicated in the Octave field
Base octave +1 [note]	Enters a note in the next higher octave indicated in the Octave field
Base octave +2 [note]	Enters a note two octaves higher than the one indicated in the Octave field
Set octave $[0-9]$	Sets the selected note's octave.
Chord Modifier	The modifier key(s) that calls a chord rather than a note. The chords are set and assigned in the Chord Editor.
Note Cut (without instrument number)	Enters a Note Cut command (^^), leaving the instrument field blank.
Note Off (without instrument number)	Enters a Note Off command (==), leaving the instrument field blank.
Note Fade (without instrument number)	Enters a Note Fade command (~~), leaving the instrument field blank.

Note Cut	Enters a Note Cut command (^^) and the current instrument.
Note Off	Enters a Note Off command (==) and the current instrument.
Note Fade	Enters a Note Fade command (~~) and the current instrument.
Parameter Control	Enters an absolute Parameter Control event (PC).
Parameter Control (Smooth)	Enters a smooth sliding Parameter Control event (PCs).

Instrument Column

These shortcuts are applied when the pattern editor has focus and the cursor is in the instrument column (the second column).

Shortcut	Description
Set Instrument Digit $[0-9]$	Enters the digit into the rightmost place in the instrument field, moving the existing digits to the left.

Volume Column

These shortcuts are applied when the pattern editor has focus and the cursor is in the volume column (the third column).

Shortcut	Description
Set Volume Digit [0 - 9]	Enters the digit into the rightmost place in the volume parameter field, moving the existing digits to the left.
Volume	Enters a note volume (vxx) command into the pattern.
Panning	Enters a panning command (pxx) into the pattern.
Volume Slide Up	Enters volume slide up (cxx) into the pattern.
Volum Slide Down	Enters a volume slide down (dxx) into the pattern.
Fine Volume Slide Up	Enters a fine volume slide up (axx) into the pattern.
Fine Volume Slide Down	Enters a fine volume slide down (bxx) into the pattern.
Vibrato Speed	Enters a vibrato speed command (uxx) into the pattern.
Vibrato Depth	Enters a vibrato depth command (hxx) into the pattern.
XM Pan Slide Left	Enters a pan slide to the left (lxx) into the pattern.
XM Pan Slide Right	Enters a pan slide to the right (rxx) into the pattern.
Portamento	Enters a tone portamento command (gxx) into the pattern.
Portamento Up	Enters a pitch bend up command (fxx) into the pattern.
Portamento Down	Enters a pitch bend down command (exx) into the pattern.
Offset	Enters a coarse sample offset command (oxx) into the pattern.

Effect Column

These shortcuts are applied when the pattern editor has focus and the cursor is in the effect column (the fourth column). Alphanumeric effect letters (0-9, A-Z) are currently not editable — they are automatically assigned to the respective keys on your keyboard.

Shortcut	Description
MIDI Macro Slide	Enters a Smooth MIDI Macro Slide (\xx) into the pattern.
Combined Note Delay and Note Cut	Enters a Delay-Cut (:xy) command into the pattern.
Parameter Extension Command	Enters a Parameter Extension Command (#xx) into the pattern.

Effect Parameter Column

These shortcuts are applied when the pattern editor has focus and the cursor is in the effect parameter column (the fifth column).

Shortcut	Description
Effect Parameter Digit [0 − F]	Enters the digit into the rightmost place in the effect parameter field, moving the existing digits to the left.

Sample Editor

These shortcuts are applied when the Samples Tab is active.

Shortcut	Description
Trim sample around loop points	If loop points are specified, all sample data outside of these start/end times are deleted.
Silence sample selection	All of the sample data within the selected area is set to zero, effectively placing silence in that span.
Normalise Sample	Applies Normalisation to the sample.
Amplify Sample	Opens the Amplify dialog, allowing you to alter the volume of the sample and apply Fade In or Fade Out (from / to silence).
Reverse Sample	Puts the selected sample data in reverse order, so it is being played backwards.
Delete Sample Selection	Deletes the sample data within the selection, moving the remaining data together.
Zoom Out	Decreases the data-to-display ratio, effectively zooming out to show less graphic detail of the sample data. The values "wrap" so when you Zoom Out to the lowest ratio, using the command again goes to the highest ratio.
Zoom In	Increases the data-to-display ratio, effectively zooming in to show more graphic detail of the sample data. The values "wrap" so when you Zoom In to the highest ratio, using the command again goes to the lowest ratio.
Invert Sample Phase	Inverts the sample's phase, i.e. it is mirrored along the time axis.
Signed / Unsigned Conversion	Re-interprets the sample data as a signed or unsigned sample.
Remove DC Offset	Removes an unwanted static DC Offset from the waveform, i.e. it is centered around the time axis.
Quick Fade	Applies a fade-in for the selected sample data if the selection includes the beginning of the sample, or applies a fade-out if the selection includes the end of the sample. If neither the beginning or end of the waveform is part of the selection, the Amplify dialog is shown.
Crossfade Sample Loop	Opens the Crossfade Loop dialog to crossafe the sample loop's end with the loop start, to create seamless loop transitions.
Tune Sample to given Note	Opens the Sample Tuner dialog, where the sample can be tuned to a given note.

Load Sample	Opens the Open File dialog to allow you to import a sample file into the sample slot. This command also works in the Instrument Tab, importing an instrument to the next Instrument slot.
Save Sample	Opens the Save File dialog to allow you to save the sample as a Wave Audio or Raw file into a folder of your choice. This command also works in the Instrument Tab, saving the Instrument and its accompanying samples as an .iti or .xi file.
New Sample	Creates a blank sample in the next unused slot. This command also works in the Instrument Tab.

Instrument Editor

These shortcuts are applied when the Sample Map on the Instrument Tab is focussed.

Shortcut	Description
Duplicate Instrument	Creates a new instrument slot using ALL the same instrument attributes as the currently displayed instrument.
Edit Sample Map	Opens the Sample Map dialog.
Edit Current Sample	Opens the Samples page of the currently selected sample slot.
Map All Notes to Selected Note	Sets the currently selected note to all notes.
Map All Notes to Selected Sample	Sets the currently selected sample slot to all notes.
Reset Note Mapping	Resets the note assignments, so that each note maps to itself (C-5 → C-5, D-5 → D-5, and so on).
Transpose +1 (Note Map)	Transposes the whole note map up one semitone.
Transpose -1 (Note Map)	Transposes the whole note map down one semitone.
Transpose +12 (Note Map)	Transposes the whole note map up one octave.
Transpose -12 (Note Map)	Transposes the whole note map down one octave.

Envelope Editor

These shortcuts are applied when the envelope editor on the Instrument Tab is focussed.

Shortcut	Description
Zoom In	Increases the detail of the Envelope Window, showing a smaller excerpt of the envelope.
Zoom Out	Decreases the detail of the Envelope Window, showing a bigger excerpt of the envelope.
Select Previous Envelope Point	Moves the selection to the previous envelope point.
Select Next Envelope Point	Moves the selection to the following envelope point.
Move Envelope Point Left	Moves the selected envelope point left one tick.
Move Envelope Point Right	Moves the selected envelope point right one tick.
Move Envelope Point Up	Moves the selected envelope point up one unit.
Move Envelope Point Up (Coarse)	Moves the selected envelope point up 8 units.
Move Envelope Point Down	Moves the selected envelope point down one unit.
Move Envelope Point Down (Coarse)	Moves the selected envelope point down 8 unit.
Insert Envelope Point	Inserts an envelope point after the selected point.
Remove Envelope Point	Deletes the selected envelope point.
Set Loop Start	Sets the selected envelope point as the Envelope Loop start point.
Set Loop End	Sets the selected envelope point as the Envelope Loop end point.
Set Sustain Loop Start	Sets the selected envelope point as the Sustain Loop start point.
Set Sustain Loop End	Sets the selected envelope point as the Sustain Loop end point.

| Toggle Release Node | Toggles the selected envelope point as the start point for the Release Envelope. |

Plugin Editor

These shortcuts are applied when a plugin window is focussed.

Shortcut	Description
Previous Plugin Preset	Selects the previous plugin preset / patch.
Next Plugin Preset	Selects the following plugin preset / patch.
Plugin Preset Backward Jump	Jumps back 10 entries in the preset list.
Plugin Preset Forward Jump	Jumps forward 10 entries in the preset list.
Randomize Plugin Parameters	Give random values to all parameters of the current plugin.
Toggle Parameter Recording	Toggles the parameter recording function, which allows you to record parameter changes from plugin window into the pattern.
Pass key presses to Plugin	Toggles the Pass Keys function, which sends all keyboard input to the currently open plugin window (e.g. for entering a serial number in the plugin GUI).
Bypass Plugin	Toggles plugin's bypass property to control whether audio is routed through the plugin or not.

Hidden Settings

Some settings cannot be changed directly in OpenMPT, however they can changed by modifying OpenMPT's configuration file, mptrack.ini.

[Misc]

- **DefaultModType**: Defines the default format that is used when creating a new module. Possible values: mod, s3m, xm, it, mptm.
- **DefaultPlugVolumeHandling**: Defines the default setting of the plugin volume handling behaviour.
- **MRUListLength**: Sets the maximum length of the most recently used file list in the file menu. Allowed values are between 0 (no list) and 15 entries.
- **ShowHackControls**: Some (obsolete) normally invisible dialog controls are displayed in the program interface if this option is set to 1.

[Paths]

- **UseAppDataDirectory**: By default, this is set to 1. If set to 0, portable mode is enabled and mptrack.ini and other configuration files are placed directly in the same directory as OpenMPT's executable (by default they are placed in %APPDATA%\OpenMPT). This setting is only considered if the configuration file is already placed in the same directory as OpenMPT's executable! See also: System Setup.
- **Export_Directory**: The default export directory for WAV and MP3 export. OpenMPT always uses the last used directory for exporting, so changing this setting does not make a lot of sense.

[Pattern Editor]

- **DefaultSequenceMargins**: Defines how many order items are shown at least before and after the currently selected order item. By default, this option is set to 2.

[Sample Editor]

- **FinetuneStep**: Sets the granularity of the sample frequency spin button in the sample editor. By default, one click on the spin buttons increases or decreases the Middle-C frequency by 25 Hertz, but here you can enter any other amount.
- **UndoBufferSize**: The maximum size of the sample undo buffer per module (in MebiBytes). By default, it is set to one tenth of the physical memory size.

[VST Plugins]

- **HostProductString**: Here you can enter a custom host name that is sent to VST plugins. This can be useful if a plugin claims to only run in certain hosts and refuses to run in others.
- **HostVendorString**: Here you can enter the host vendor name for the same reasons as above.
- **HostVendorVersion**: Here you can enter the host version as a 32-Bit integer for the same reasons as above.

Command-line Parameters

The following command-line parameters can be specified when launching OpenMPT:

- **/nologo**: Suppresses the OpenMPT logo on startup.
- **/nodls**: OpenMPT will not search installed DLS soundfonts during startup.
- **/noacm**: OpenMPT will not search for ACM codecs during startup.
- **/nomp3**: OpenMPT will not search for the presence of an (non-ACM) MP3 codec during startup.
- **/noplugs**: OpenMPT will not load any plugins.
- **/wavex**: Multichannel support is explicitly enabled (only required if DirectX 6 or older is used).
- **/debug**: Debug mode is enabled (this does not actually do anything useful)
- **/noSettingsOnNewVersion**: After upgrading to a new OpenMPT version, the setup window is not shown.
- **/portable**: Portable mode is enforced.

Frequently Asked Questions

Audio and MIDI

OpenMPT does not output any sound

Check your sound device setup. A common problem are ASIO drivers that only work in exclusive mode, such as **ASIO4All**. If you use ASIO4All and have another application running that makes use of that sound device (such as a web browser, instant messenger, media player, ...), ASIO4All will not emit any sound. In that case, switch to another sound driver in OpenMPT's settings.

Vice versa, it is also possible that another program occupies the sound device in exclusive mode, for example using an exclusive WASAPI driver. In that case, this program restricts other applications from accessing the sound device.

While OpenMPT is active, all other programs are muted

This is for the same reason as above. If your ASIO driver only works in exclusive mode, other programs cannot output any sound while OpenMPT accesses the soundcard.

Can I use OpenMPT to interact with external MIDI gear?

To be able to record MIDI Input and send MIDI data to external gear, you first have to set up MIDI in OpenMPT.

MIDI Input does not work

- Have you clicked on ther MIDI Record icon?
- Verify that no other application is accessing the MIDI port.
- Verify that other applications *do* actually receive incoming MIDI data. More often than not, MIDI devices are not set up properly to send MIDI data to a computer. A light-weight application that can be used for checking is SendSX [1].

MIDI Record icon

Pattern Editor

How can I change the length of a pattern?

In the Pattern Editor, either click the yellow question mark icon or the pattern number in the upper-left corner of the pattern (labelled *#0* or similar) to open the Pattern Properties window. Note that this feature is not available for MOD and S3M files, you will have to use pattern break commands in those formats to shorten patterns.

How can I change the playback speed of a pattern?

You can use Tempo and Speed change commands to change the playback tempo of a pattern. The actual interpretation of those commands depends on the Tempo Mode that is used.

The input cursor automatically moves after I have entered a note

You have probably accidentally enabled row spacing in the pattern editor. Setting row spacing to 0 will keep the cursor from advancing to the next pattern row.

What do those +++ patterns do?

Actually, they do not do anything. They are just separators which you can use to keep your sequence tidy. You can for example add them after every few patterns to visually highlight a group of patterns. If such a pattern is encountered while playing, OpenMPT simply skips over it.

The pattern display is laggy during playback

If you have "Follow Song" enabled, but the pattern display scrolls only in coarse steps, you have probably set the sound device's latency too high. With WaveOut and DirectX drivers this is nearly inevitable, but with ASIO you can get very smooth pattern scrolling.

I want a score of my module music

OpenMPT does not natively support a staff view. However, you can export your work to MIDI and then use for example LilyPond [2] to produce sheet music.

Sample Editor

How can I load just the left or right channel of a WAV file?

You can split up a WAV file into its individual channels by opening it as a module rather than a sample. Every channel is then loaded into a separate sample slot.

Plugins

How can I route the output of a plugin to another plugin?

It is possible to route the audio and MIDI output of a plugin to another plugin. To enable plugin chaining, choose a plugin from the Output To list in the plugin's mix settings.

My plugin (jBridge, Synful Orchestra, ...) crackles and clicks

Some plugins do not like if the plugin host sends varying amounts of audio data to be processed by them. While sequencers usually always send the same amount of data to plugins to process, this is not the case with most trackers, including OpenMPT, Psycle and Renoise (if its static plugin buffer is disabled). If you encounter such a plugin,

please notify the plugin authors of the problem so that they can make the plugin compatible with hosts like OpenMPT.

Can I load 64-Bit VST plugins into OpenMPT?

Yes, this is possible if you have jBridge [3] installed. However, in order to use jBridge, you will have to run OpenMPT with administrator privileges. You can then simply add 64-Bit VST plugins like 32-Bit VST plugins to OpenMPT's list of known plugins.

Module Formats

My module sounds different when played in other trackers

Please read the hints on compatible playback.

When converting to MOD, all samples sound strange

The frequency of the middle-C is fixed to about 8 KHz in the MOD format, thus if you were using samples with a higher or lower middle-C frequency, they will sound detuned when converting to the MOD format.

My files do not open in MikMod / FMOD / name your player here

Some less compliant module libraries will fail to load perfectly valid XM / IT files. You can try re-saving those files with Fasttracker 2 or Impulse Tracker if necessary, or just avoid using those libraries.

Miscellaneous

Why is previously usable Feature X unavailable in the latest version of OpenMPT?

Over the years, various people have added features to the IT and XM format without considering that other trackers or players would not support them. Having new features is of course a nice thing, but they should not be hacked into existing file formats. That is why they are gradually removed from the IT and XM formats to be exclusively available in the MPTM format. Of course, these features are still available when importing an old IT or XM file made with previous versions of OpenMPT, but you cannot use them in newly created files.

Examples of previously supported features are Tempo Mode, Envelope Release Node, Pitch / Tempo lock, etc.. If you want to those features, use the MPTM format. You can convert existing songs to this format using the Song Properties dialog.

Can I sell the music I have created with OpenMPT?

Yes, you are absolutely free to do whatever you want with the music you create with OpenMPT.

Is OpenMPT portable?

Yes, it can be configured to be fully portable.

References

[1] http://www.bome.com/products/sendsx
[2] http://lilypond.org/
[3] https://jstuff.wordpress.com/jbridge/

Tutorial

Getting Started with OpenMPT

Introduction

Welcome to this beginner's tutorial. It is directed towards newbies who have just downloaded OpenMPT and are about to get started with using the program. Read this tutorial to get the hang of this piece of software. In easy steps, you will learn how to load samples and use them to create a simple song. This tutorial will not cover each screen in depth. There are other pages in this manual that do this.

This tutorial will use the song Aryx.s3m as a reference. You can download Aryx at The Mod Archive [1].

Getting Started

If you have not even downloaded OpenMPT yet, you should read the System Setup page first for instructions on how to download and install OpenMPT.

Assuming that you did everything on that page, you can now start OpenMPT. If it is the first time that you start the program, the setup dialog will pop up. You can configure OpenMPT to your needs now, or you can do that at a later stage by pressing View → Setup.

Setting up the sound card

The only important thing right now is to set up the sound card properly. Go to the Sound Card tab. Check the available sound devices by pulling down the list. If you have an ASIO device, select it (selected by default on first run). Otherwise a DirectSound device is preferred (blue circle with yellow X in it). If using an ASIO driver, you should be able set the buffer length (latency) to less than 10ms without problems. If you use DirectSound or Wave Out, try a value between 30-75ms.

The lower this latency is, the better — But setting the buffer length too low will result in crackling.

Setting up the keyboard

This tutorial references key combinations that are used by the default keyboard configuration of OpenMPT. Depending on the language of your Windows system, the OpenMPT installer might have chosen a different keyboard configuration, though all default keyboard configurations are almost identical and are mostly adjusted to fit differening keyboard layouts. If some of the keys referenced in this tutorial do not "fit", you may want to go to the Keyboard Settings and hit the "Restore default configuration" button.

When you are done, press OK to close the dialog.

Setting up the keyboard

Creating a new song

In the menu bar, go to the "File" menu, open the sub menu "New" and choose "IT" from the list of offered formats.
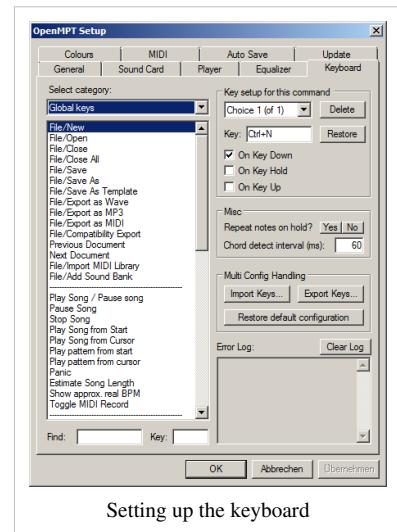
Loading drum samples from Aryx

OpenMPT can handle working on several songs at once. You probably will not want to actually edit two songs at the same time in most situations, but you can view one while working on another. :) We are going to use this principle to load in samples from Aryx, which you should have downloaded from the link given above.

The second icon in the toolbar is the open button. Press this button to open an existing song. Browse to the Aryx song. Note, OpenMPT can load songs inside ZIP archives, and also from RAR, LHA and GZ archives. You must set the file filter to **All files** to let the ZIP files be shown though… and saving is not possible to a ZIP file. :)

Once you have loaded Aryx, you will see that it appears in the Tree View on the left. It will also be the active song.

- In the tree view, click on the **untitled** folder to jump back to our newly created module.
- Click on the **Samples** tab.
- In the tree view on your left, locate Aryx again. Do not click on Aryx, but on the little plus sign next to the **Samples** folder to expand it.
- Drag "3: Time: 2:21" to the big black screen on the right to load that sample.
- Click on the first icon in the toolbar on this screen (New Sample). Drag "6: Tune composed using" to the right to load it too.
- Click on the New Sample button. Drag "5:" to the right to load it as well.
- Click on the New Sample button. Drag "4: _____" to the right to load it too.

When you see these waveforms, note that you can use any key on your keyboard (A-Z) to get sound out of them. This works like a piano. In fact, most keyboard configurations will actually set it as a piano with the white and black keys positioned as that too. The default configuration however allows

"Aryx" in the tree view.

you to have more notes to work with. Note that when pressing QWERT in that order (AZERT on a french keyboard), the tone pitch raises by semitones. ASDFG does the same but one octave higher, and ZXCVB is the same too but another octave higher.

We have now loaded some basic samples which we can use to make a drum pattern.
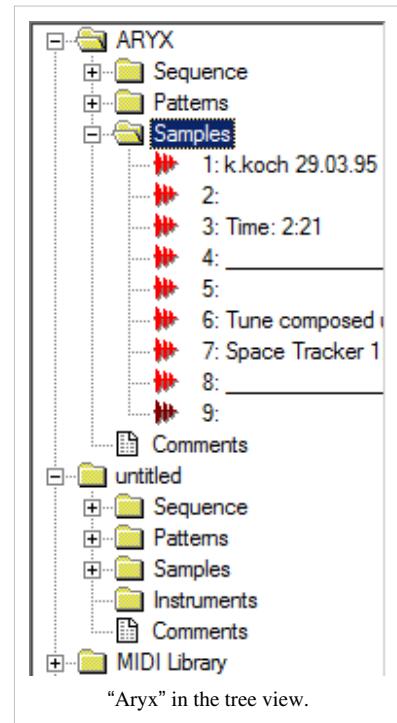
Making your first 4/4 drum pattern

4/4 drum patterns (aka "Four-to-the-Floor") are common in all kinds of disco and dance music. Really simple stuff so it is great to start with that. First, let us go to the **Patterns** tab to be able to enter notes.

Since making a beat largely depends on the time signature used, it is nice to actually see the beats in your pattern. If every row in the pattern looks the same to you, row highlighting has probably been turned off. In that case, you can turn it on again in the colour setup. Turn on both "Primary highlight" and "Secondary highlight".

As you see, every 16th row has a darker colour than every 4th row. These are measures and beats. By default, a pattern has four measures with four beats each. This can be changed, but we are not going to do that now.

- In the toolbar, you see a dropdown list with a spin button on the left side. In this list, you can choose the **main instrument** that is used for editing. Set this to **01:...**, as it can be seen in the screenshot on the right.
- Next to this dropdown list, you see **Row Spacing**. Set this value to 4. It will make the pattern cursor move down by four rows after having entered a note.
- In the toolbar on top (below the menu) there is a field **Octave** which configures the base octave of your keyboard. By default, this is to 4, so if you have changed it before, set it to 4 again.
- Click on the first row in Channel 1.
- Make sure that the cursor is positioned in the leftmost cell of that channel. This cell is used for entering notes.
- Start tapping A until you have a C-5 01 on row 12.
- Now, select the measure you have just entered using your mouse cursor:
  Click on the **0** left to the first row of the first pattern and hold the mouse button clicked while you drag the mouse down to the row that has **15** next to it. Release the mouse button and press Ctrl+C (or choose **Copy** from the **Edit** menu).
- Move the cursor to the leftmost column of the row that has **16** next to it. Right-click on that position, choose **Paste Special** from the menu, and in the now opening sub menu, choose **Paste Flood**. Great, now the whole pattern is filled with a 4/4 beat! Using **Paste Flood**, you can quickly create beats and other song structures that do not change a lot.
- Press F6 to play your first pattern.

At any time, you can press F8 to stop the sound, so you can continue to work. Now would be a good time to press F8. :)

Select the first instrument and start jamming!
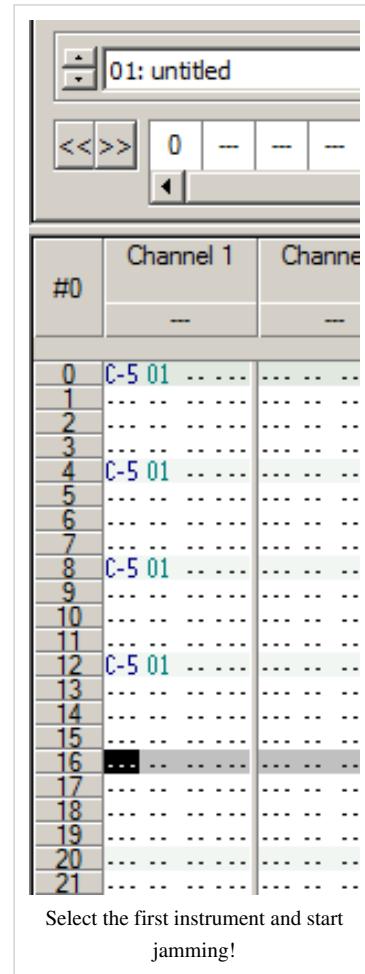
Adding percussion to your rhythm

Of course this simple 4/4 drum beat is not enough. Let us add some Hi-Hats in between.

- Start by selecting instrument 04 from the **main instrument** panel above.
- Scroll up so you can see row 0 again.
- Select the first cell in channel 2, row 2.
- Yet again, make sure you are on the left side of this cell.
- Start tapping Z until you have a C-6 04 on row 62. Again, you can speed up this process by using **Paste Flood** if you want.
- Press F6 to audit the result.
- Set the **Row Spacing** to 1 using the toolbar above.
- Select the cell in channel 2 on row 29 and press Z to enter a note.
- Scroll down, select the cell: channel 2, row 61 and enter a note there too.
- Note how the cursor automatically moves to row 62. Press Delete to remove the note.
- Move right to and press delete again to also remove the 04.
- Move left again, and one down to row 63 and press Z to enter a note.
- Press F6 to audit the result.

Adding a snare to give it even more depth

- Select Instrument 2 from the **main instrument** panel above.
- Set Row Spacing to 8.
- Select the first cell of channel 3, row 4.
- Start tapping Z until you have a C-6 02 on row 60.
- Press F6 to hear the result.

A hint in between

You have now succefully created a drum loop. Before you continue, note how we made use of every fourth line for the beat to emphasize it, and every second line after to get a balanced feeling. Also note how between lines 29 and 31 and 61 and 63 we used the other two lines to make it out of balance to get a nice variation. You will learn how this works automatically by making more music, though it will probably not happen within a week, maybe not even in a month. To start with, you should therefore experiment with different settings and see if you can create different kind of drum loops. Often, you can make a beat sound more interesting by delaying or pushing up some notes by a line every now and then.

This however just takes time, so do not worry and let us continue to the next part of this tutorial.

Adding a Bassline

Before I just tell you what notes to enter, I would like to explain a bit how basslines work. A bassline is not just a melody played on a lower octave with a bass instrument. A bassline actually forms part of the rhythm. The bassline usually sets the base note for your rhythm. The bass section in a song can be seen as part of the background. Although it is strong and present, it usually does not play a melody of its own. In certain musical styles, it can be done to play a repetitive melody so that you get more groove.

Okay, so let us add that bassline to our track! To start, we will need a sound for our bass.

Select the sample tab and create a new sample (first button in the sample toolbar). From the treeview, drag in sample 8: _____ from Aryx to your sample window. This will be our bass sound. Before we enter our bassline, let us play the pattern one more time by pressing the play button on the main toolbar (below the menu) to get some ideas on what to enter, and stop playback once you get an idea. As this is a tutorial, I do not

expect you to actually get ideas yet, but at least you now know a way to look for inspiration. :)

Entering a simple bassline

Go back to the pattern screen and select sample 5 from the toolbar if that has not been set yet.

Go to the first cell of channel 4, row 0, and press E, which will put in a D-4 05. Play the pattern to hear the result. As you can hear, the sound is there, but it certainly is not a bass sound. It is too high for that. We will need to adjust the octave in order to get the right range of notes. In the main tool bar, there is an **Octave** setting. Set it to 3 using the arrow buttons next to it.

Again, go to the first cell in channel 4, row 0 and press E to enter a D-3. Play it again to hear the difference. Note that pressing a number between 0 and 9 while having the cursor on a note is also a quick way to change the octave of an existing note, but doing this for every note can be quite tiresome. Let us make the bassline more fancy. Remain in channel 4 and press the following keys in the following rows:

- Row 16: Press Y
- Row 32: Press Q
- Row 48: Press I

And play your pattern.

We have just created a really simple bassline, but frankly, it sounds rather dull at the moment. Let us make it a bit better by adding silence.

Enter the following notes:

- Row 8: Press the key left to the "1" key to put a Stop note ("^^") in the pattern. On US keyboards, this key is labelled "~" and will from now on be referenced as such.
- Row 24: press ~
- Row 40: press ~
- Row 56: press ~

Entering a more complex bassline

Okay, so this is indeed a better bassline, but you will probably be like: "But how about those fancy dance basslines?" Sure, We will make one. To start, remove the notes in channel 4 first. Make sure that you are in channel 4, and hit Ctrl-L. This will make a selection in that column. If you accidentally hit Ctrl-L again, it will select the entire pattern. Hit it again to select just one channel. Press Delete to delete the content.

Go back to row 0. At this time, we are going to make it easy for us. Set the row spacing to 2, and repeat the following four times:

- Press ~
- Press E

Then do the following 4 times:

- Press ~
- Press Y

Do the same 4 times with Q and I.

Adding a bassline makes our song a lot more interesting.

If you have done it right, you should have this nice dancy baseline.

Adding a Melody

Basically this is the same as adding a bassline, except that you will be focussing on that what plays in the foreground.

The melody is something that can continuously change throughout the entire track, or can be a repetition with certain variations. In order to know what types of melodies there are, listen to music, focus on the melodies and start noticing. :)

But at this stage, we just want to add a melody to our tutorial song, so let us add a sample for that.

- Go to the Sample tab
- Create a new sample
- Drag sample 2: to the right.

Now, go back to the pattern editor and let us enter a simple melody. Select Sample 6 from the toolbar for that.

Assuming that you still have the row spacing set to 2, go to channel 5 row 0, and enter the following notes:

C, ~, B, N, ~

Then go to row 24 and enter the following notes:

<, ~, N, ~, Z, ~, C, B, ~

Then go to row 56 and enter the following notes:

N, ~, B, ~

You now have created a basic melody.

Adding depth to your melody to make it cool!

Yes, I have to admit, the melody is a bit dry like this. So let us put an echo on it. There are several ways to do it actually. You could program the echo in the patterns or you could use a sound processing plugin.

Here, will actually discover both possibilites to learn about various techniques.

First, we start with the easier solution (although I prefer the second solution)

Plugins are managed in the lower part of the General Tab.

Adding an echo using a plugin

- Go to the **General tab**.
- In the lower third of the tab, you see the plugin configuration area. There is a dropdown list which reads "FX1: undefined".
- Next to that list, click the **Select** button.
- Expand the **DirectX Media Audio Effects** folder.
- Double-click **Echo**.

"FX1: undefined" has now changed to "FX1: Echo". Let us add it to our lead melody to hear its effect.
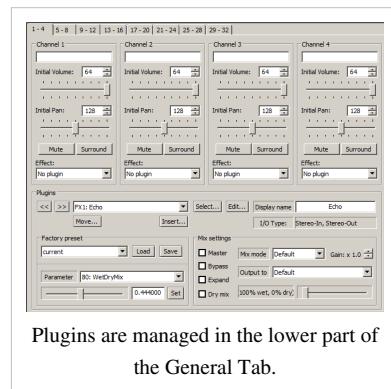
- Above the plugin configuration area, you can find the channel settings. At the top of this area, there are tabs labelled "1 - 4", "5 - 8", and so on. As our melody is in channel 5, we select the **5 - 8** tab.
- Below Channel 5, there is a dropdown list labelled **Effect**. In that list, select **FX1: Echo**.
- If you play our songs now, it sounds surprisingly nice already, but we are going to make it sound even nicer.
- In the plugin configuration area, press the **Edit** button next to the **Select** button we pressed earlier.
- Set the **WetDryMix** parameter to 44.40, by entering 444 in the edit box next to the corresponding slider.
- Set the **Feedback** to 50.00 (enter 500 in the edit box).
- Set the **LeftDelay** to 360.82 (enter 180)
- Set the **RightDelay** to 720.64 (enter 360) — Notice that the right delay is twice as long as the left delay.
- Set the **PanDelay** to Yes (drag the slider way up).

And there we go, a nice echo on the lead!

Adding an echo using pattern programming

First, we remove the echo from the previous step again.
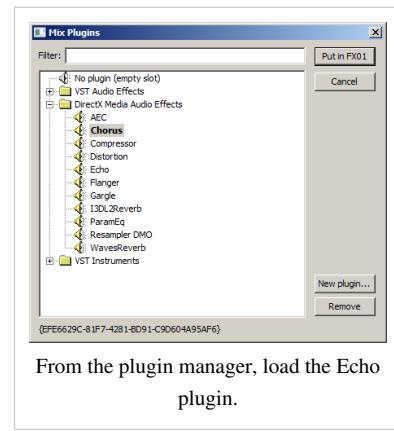
From the plugin manager, load the Echo plugin.
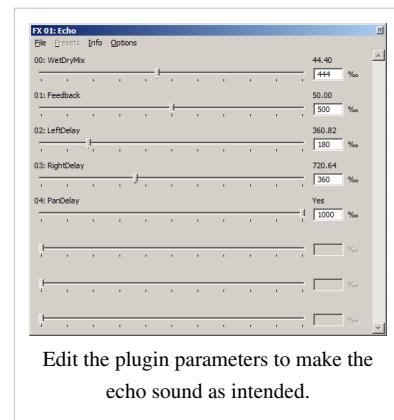
Edit the plugin parameters to make the echo sound as intended.

- Go back to the General Tab if you have left it in the meanwhile.
- In the plugin area, check the **Bypass** checkbox, so that our echo effect will not be processed anymore.

If you want, you can also remove the echo effect completely by clicking the **Select** buton and choosing **No plugin** from the plugin list.

Now, go back to the pattern editor.

- Put your cursor on channel 5 and press Ctrl-L, Ctrl-C.
- Go to channel 6, or press Tab to go to the next channel. Go back to row 0, by pressing Ctrl+Home and press Ctrl-V.

An exact copy of your channel has been made. That is of course not an echo yet.

- Press insert 3 times.
- Press Ctrl-L and then Ctrl-M.
- Enter Amplify by 50%.
- Repeat the above steps for Channel 7, so Ctrl-C, Tab, Ctrl-V, 3x insert, Ctrl-L, Ctrl-M, 50%.
- Repeat the above steps for Channel 8.

If done correctly, the notes in channel 8 have a **v08** next to them. This means that play at a volume of 8, which is quite soft (the maximum volume is 64).

Note: We have duplicated the channel using the Copy and Paste mechanism. Of course this would be quite tiresome if we want to duplicate a channel that contains some note data on several patterns already. For that reason, you can also use the **Duplicate Channel** menu item from the channel header's context menu to speed this process up.

Working with the order list

Now you know how to fill a pattern with notes so you can create some music. Let me explain how to create different patterns and play them as a song.

Directly above the pattern view, you can see a big horizontal bar with squares in it. The first square is filled with **0**, the rest with **---**. This is the **order list**. It dictates in which order the different patterns are played. So far, only pattern 0 (the first pattern) is played at all, as we do not have any other patterns yet.

Every number in the order list references a pattern. In the pattern editor, you can see the number of each pattern in the top left corner, above the row numbers. At the moment, it should say **#0**. Note that you can click this number to bring up the Pattern Properties dialog which you can use to **change the length of the pattern**, i.e. how many rows the current pattern contains.

- Back to the order list. Right-click the **0** and select **Duplicate Pattern** from the context menu.
- Go back to the pattern editor and use the mouse to make a selection from channel 4, row 0 to channel 8, row 63.
- Press Ctrl-Q 5 times. Now you have transposed the notes in those channels, which is one way to alter patterns.

You can also remove and / or add notes to change the pattern. Here, creativity is your key.

In the orderlist, you can also right-click a pattern and select **Insert Pattern** to make a new order with the same pattern. That way, when you play your song, it will have the same patterns played twice. Note that if you edit the first occurrence of a pattern, it will change **all** patterns with the same number.

Now, select pattern 0 from the order list, right-click it, and select **Insert Pattern**. Now you should have an order list that contains pattern 0 twice and after that pattern 1. Now, do the same for pattern 1, so that the order list reads 0-0-1-1.

Now we want to listen to our song. In the main toolbar below the main menu, click the play button. Now you can can watch how the patterns play by checking the **Follow Song** checkbox.

You can go on building your song from here. When you right-click an order list item, you can also choose **Create New Pattern**. This creates new, completely empty pattern. Sometimes, this is useful if you have made a transition and want to start with completely something new.

Keeping your order list tidy

A neat trick to keep the order list tidy is to add separator (**+++**) patterns. You can think of them as markers that do not contain an actual pattern but are being skipped. It is common to add a separator pattern after each four patterns, as that fits with most song structures. To insert a separator pattern, click on an empty pattern (**---**) and press the Minus key once. If you want to

A tidy order list can speed up editing significantly.

add a separator pattern between two existing patterns, you can simply drag a **---** pattern between them and do the same. Or, you could right-click the pattern after which you want to insert a separator pattern, choose **Insert Pattern**, press **0** until the cell says "0" and then press Minus twice. As with many other things in OpenMPT, there are mutiple ways to do the same thing. :)
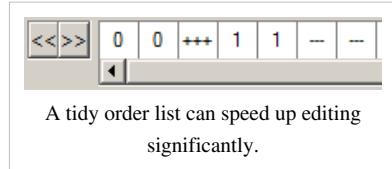
It is also worth knowing that you can select a range of patterns to insert or duplicate. Simply click on the first pattern that you want to insert / duplicate and Shift-Click the last pattern. Now you can drag multiple patterns at the same time, duplicate them, etc...

That's all, folks!

That's it for now. If you have any questions, feel free to ask them at our forums [2].

If you want to see the tutorial song as it should be if you have done everything as described above, you may download it [3].

References

[1] http://modarchive.org/module.php?34036

[2] http://forum.openmpt.org/index.php

[3] ftp://ftp.untergrund.net/users/sagamusix/openmpt/resources/modules/beginner_tutorial.it